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The essential purpose of the five papers compiled in this report is to summarize, analyze, and interpret recent tendencies in educational theory and practice and their implications for "the heart of the educational process," i.e., the curriculum. The papers focus on general strategies or methodologies of instruction, rather than specific subject content, and represent an interdisciplinary approach (Dr. Harold Stahly, psychology; Dr. John Renner, science; Dr. Robert Hogan, language arts; Dr. John LeBlanc, mathematics; and Dr. William Gardner, social studies). Their titles and major emphases are as follows: "Psychological Aspects of Curricular Change" (applies principles of psychology to instructional methodology and to the more general problems involved in instituting educational change); "The Structure of School Science Programs" (calls for a science curriculum based on the nature and process of inquiry); "Recent Curriculum Trends in English" (emphasizes the importance of the human element--child-centered curriculum and individual teaching styles); "Changes in the Schools: Implications for Learning and Teaching Mathematics" (focuses on needed revisions of teacher training programs in light of recent developments); and "Search for Meaning--an Emerging Model for the Social Studies" (compares and contrasts traditional and emerging models, stressing need for inquiry-oriented, experience-based curriculum). (JS)

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IN SEARCH OF MEANING

SUMMARY REPORT
INTERDISCIPLINARY SEMINAR IN SCHOOL ADMINISTRATION

Donald L. Hanson, Director

University of Northern Iowa
Summer 1969
Volume II

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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INTRODUCTION

Since the heart of the educational process is the Curriculum it would be a natural consequence that this should become the theme for the Interdisciplinary Seminar in School Administration. The limitation of time characteristic of any Summer session obviated our initial task -- the identification of curricular areas to be emphasized. With tradition on our side we settled on the four basics of the curriculum -- language arts, social studies, mathematics, and science.

Any one curricular area could well be the topic for an entire seminar. However, we were not particularly concerned with subject content; rather, our concern was with methodologies and strategies for instruction. The curricular areas were viewed as vehicles for the application and implementation of these strategies. A prior concern became the basis for introducing the series - - as well as a common focus for the succeeding four sessions. That much change is taking place in education is obvious to all. But in the heat of this change what happens to the learner? Are we effecting significant progress in the improvement of learning and the learning process? Are the by-products of our efforts all positive and lasting?

The search was begun for resource personnel to aid us in our task. We wanted individuals who were most aware of what was going on in education today, but who were also front-line performers having observed, applied or directed programs or projects atypical of the mainstream. It is no expression of modesty or egotism -- just a fact -- when we claim success. The resource personnel individually and collectively were the very best available. The performance of each on his visit to the campus attests to this fact. Further evidence is the content of the papers included in this report. The finest testimonial to their contribution resides in the actions, reactions, and comments of students. The thought processes were activated and a continuous dialogue among students was heard throughout the Summer. We are real confident that the final result will be evidenced through a form and degree of changed behavior by participants on returning to their respective schools. This is real learning!

A sincere thanks to all who made this series a success. True success is rarely, if ever, the product of individual effort. Such was certainly not the case in this instance. It is our desire to continue this seminar format in succeeding summers and the quality of performance of our guests greatly enhances a realization of our goals. We soundly endorse and recommend any and all the resource people who have contributed to this project.

Donald L. Hanson
Seminar Director

PSYCHOLOGICAL ASPECTS OF CURRICULAR CHANGE

Harold L. Stahly
The University of Michigan
at Flint

The decade of the 1960's has been a time of change in curricular organization and instructional strategies and methodologies that is without precedent in the history of American public education. For the first time on any widespread scale, we have seen schools questioning old assumptions about class schedules, the teacher's role, the student's rights, the priorities and sequencing of content, etc., etc. And, from this point in time, it seems only the beginning of a snowballing process that will radically alter that particular learning environment that we call school.

Why should there be curricular and methodological change? What, in more specific terms, are the failings of the traditional school in today's world? What does our knowledge of human learning suggest that requires change?

First, we had just as well admit that there is a great deal that is not known about how humans learn best in a complex group environment or even in isolation when the learning approximates real life significance. But there are some things about learning that we can say with good assurance, and most of these things point to a need for change.

Consider in gross terms the settings in which the greatest amount of learning takes place, and learning that apparently occurs with a high degree of efficiency. These settings are not classrooms, but instead are in the real world. Now, I'm not ready to suggest that we do away with schools; some kinds of learning apparently do require some formal organization. But we seem to have gone to extremes to make the classroom as unlike life as possible. We hedge kids in with rules that have no relevance to learning; we call them failures when we fail to motivate or instruct; we treat learning content as little, detached parcels to be filed away in some appropriate slot; we dismiss as impertinent or immature questions regarding the relevance of our content; we rely heavily for motivational purposes upon an artificial and arbitrary system of marks or grades that nobody really knows how to use; and perhaps worst of all, we treat all kids of a given chronological age as if they were essentially alike.

Oh, we talk a lot about individual differences. We recognize them, admit they are very important, talk about them in the lounge. But by and large, we don't do much about them. Large groups, usually an entire class, will all have the same assignment from the same page in the same book due on the same day. Of course this isn't always the case; but most of the things done in the name of individual child needs and characteristics are only token gestures.

This, in my judgment is the real crux of the problem in schools today. It plagues us from nursery school to graduate school. The problem of truly individualizing our instruction is the thing that the teacher in the traditional classroom usually simply cannot handle. And, if we don't find ways of individualizing instruction, then, for many kids, it means we lose the ball game.

So school organization and change must, I believe, address itself primarily to the task of individualizing instruction. Once someone has made the decisions of what should be learned, the content needs to be arranged in some order that progresses in a developing sequence. (This sequencing of learning tasks is itself an extremely important and often very difficult task--much more so than this brief mention would seem to indicate.) After that, the teacher must function as a diagnostician, determining for each individual what he already knows and what he should work on next.

For this is really the central objective in individualizing instruction: that each child be working on learning something that he does not know, yet something that he can learn because he has already learned the prerequisites. But in countless classrooms on any given school day, 30 kids will be working on the same thing; and some of those kids have already known this content for two or three years and think teachers must be pretty stupid for asking them to learn it now; and some of those kids are so far behind, they can't possibly learn what they are asked to learn, and they think teachers are pretty stupid too. Or worse, they are convinced that they themselves are hopelessly stupid, and nobody should be made to feel that.

Next in order of importance to school learning, I would place two things, about equal in their significance. These are motivation and instructional procedures. The motivation question the teacher needs continually to be asking himself is, "What will help this student (individually) to want to learn?"

Reference has already been made to two things that have profound motivational significance. The artificiality of a classroom can become almost unbearably boring. By getting into closer contact with real life, we will have eased some of our motivational problems. Even more important, if we can fit kids into a learning sequence at the proper level of difficulty, we will give an immense boost to their motivation to learn.

We have committed the sin of making learning distasteful. It need not be that way. Look at the eager inquisitiveness of the first grader; contrast that with the boredom he displays six years later. Part of the change may be culturally influenced, maybe part of it physiologically. But the school must accept a major share of the blame for this change. By quibbling over trivia, by giving him a meaningless symbol in place of seeing that he learns one thing thoroughly and then goes on to the next, and by forcing him into a mold, we have taught him that not the learning, but playing the game is important. Educational change should aim at taking the child's zest for learning and treating it very gently, nurturing it, doing everything possible to treat it as the priceless thing it is.

Finally, in regard to motivation, there is one more thing related to the individualizing of instruction. When a teacher tailors learning to an individual child, he (the child) gets the message that he is important. He is being treated with dignity and respect (it might be added that this is the best way to teach him to treat others likewise), and it is the rare human being who does not respond positively to such treatment. When we find better ways for schools to show the kids, not just say, but show them that they are each important and individually respected and recognized, then many of the motivation problems will disappear. In other words, schools must become more humane, less impersonal, less antiseptically objective about everything, more willing to act as if each individual pupil really matters.

As to my third proposed ingredient of the learning process, instructional procedure, I prefer not to link it to the topic of curricular organization. There are some generalizations relevant to instruction that could be cited; but I think it is only when we get to the more particular level of instructional strategies in a content area that the matters of school organization and curriculum are appropriately related to instruction. And that task I am well advised to leave to the instructional specialists in the various content areas.

Many of the comments that follow in this paper are at least mildly negative in tone. I hope it has become clear that this does not mean that I am opposed to change. Obviously the contrary is true; I believe that our educational system, reasonably successful with those who went to school in another era, must change. Now we are being forced really to take seriously our claim that everybody is entitled to a fair shake—to an equal educational opportunity—and the old system simply can't provide it. We must change if our society is to survive.

My big concern is with the fact that any sort of big change is accompanied by big problems. Too often the superficially enticing escape route of the faddist and the gimmick-monger lead us to despair. Too often we fail to see the major problems because the minor ones are so distracting. Too often we worry about hang-ups involving technology or hardware (and these may be serious, to be sure) and overlook difficulties in human relations. I am not trying to discourage change, but rather to deal with what seem to me to be some of the most damaging problems confronting those who are involved with change.

Some of the problems must appear to be obvious—perhaps too obvious to deserve mention. Still I have chosen to include them, with apologies if necessary, on the basis of my own experience: so often I find that the things that cause me difficulty turn out in the end to be those obvious things.

Perhaps at this point mention should be made of the general human reluctance to change. Of course, change does occur in every domain of human behavior; and at times we quickly accept and welcome it. Still it remains that generally, and particularly when it involves behaviors and values most basic to our lives, we are quite resistant to giving up the "tried and true."

As an example of this resistance, consider the length of time it took for farmers to come to accept hybrid seed corn. Despite its clearly demonstrated superiority over the open-pollinated seed, hybrid corn took the better part of a human generation to gain wide acceptance. Almost certainly some farmers went bankrupt because of their stubborn insistence on the old ways. And so it is with each of us in some way—we don't like to give up the ship. She may be a leaky old tub, but she brought us this far, and we live in hope.

Any attempt at a detailed analysis of human resistance to change would involve the whole range of human emotions and motives. But three related points in particular seem to stand out as most relevant to the topic of educational change. These are the fear of risk-taking and the unknown, the desire to hang on to the "sure thing" aspects of partial success, and the tendency to attribute cause where a cause-effect relation might not in fact exist.

When the stakes are high, each of us has some fear of risk-taking; and when school administrators and teachers, by departing from tradition, put themselves on the line, the stakes are indeed high. They stand to lose social prestige, self-esteem, livelihood, and credibility with students. We should not be surprised to hear, at the outset of some major curricular change, such comments as, "Well, I'll give it a try, but I have my doubts about it." This is not only a hedge against the possibility of loss, but is also likely to become a self-fulfilling prophecy. He who doubts the value of a procedure is, in spite of an honest effort, somewhat less likely to make it work. And doubtfulness is the safer posture to assume. (This escape-valve type of doubt should not be confused with a "show me" attitude, a kind of healthy skepticism which will be considered later.)

Perhaps the desire to stay with the old because it does, more or less, work is but another facet of the fear of risk-taking. In any event, it seems certain that the sanctuary of partial success is an enticing one. After all, a teacher (or administrator) may argue, we must be doing something right--we do have students that __________. (You fill in the blank with any statement such as "get into college," "are admitted to M.I.T.," "win the county spelling contest," "are four grade levels above the norm," etc.) These kinds of performance do seem to indicate that the school is doing something well for some of the students. But with this kind of reasoning it becomes very easy to overlook the role of the school in the performance of the losers, the failures, dropouts, underachievers, etc. So we take credit for the successes, but place blame for the failures somewhere else--on the kid himself, ("he's just lazy"), on the home ("his parents fight all the time"), on the subculture ("those people just don't value verbal learning"). Of course, this is illogical; we can't have it both ways. But such reasoning is not rare, and the comfort afforded by looking at the successes and copping out on the failures adds to the reluctance to change things.

Faulty attribution of cause and effect also needs to be considered when we feel pride in our successes. What if the student who won the spelling contest did so in spite of, rather than because of the school? The possibility at least exists. Yet we go on making all kinds of assumptions about what causes what, and on this untenable basis, propose to keep things as they are.

The same kind of reasoning also may lie behind opposition to curricular change coming from the general public. The typical vocal citizen is inclined to assert that the schools did well by him; after all, is he not relatively successful? Here again we must consider the possibility that his success in life came not because of, but in spite of the schooling he received. Further, the persons who express themselves on the matter are very likely to be just those who are successful in life. The relative failures in life (again, perhaps because of the schools, perhaps not) are the ones who are seldom heard from, and whose opinions we don't value highly anyhow.

The foregoing factors can, I believe, always be found operating, subtly or openly, in opposition to any proposals for change in the schools. The would-be innovator is well advised to expect resistance stemming from such causes and work from the beginning to neutralize it. With respect to fear of risk-taking and the unknown, the basic strategy would seem to be to move slowly and deliberately, making sure that everyone involved understands what is going on. The more actual demononstrations of successful application of the innovative idea, the less likely is the fear to materialize or persist. In counteracting the tendency to defend the old on the bases of partial success and unsupported assumptions about cause and effect, one can talk about these arguments before they appear and expose them as illogical.

Faulty reasoning is, of course, not something demonstrated only by those who oppose change. Proponents of change have themselves been guilty of illogic, and the form it most often takes is reliance on unsupported cause-and-effect assumptions. The history of education is replete with assertions that are simply assumptions passed off as fact. The person who searches the literature for good, hard empirical data to support educational policy or practice almost invariably fails to find it. The length of the school day, the long-term value of kindergarten, the utility of the study hall, the extent to which social studies curricula produce better citizens—these and countless other questions are answered largely on the basis of opinion or faith. Yet, they are basically empirical questions, questions for which the conclusive data have not been obtained and too often not even looked for.

Now, insofar as educational change is concerned, the innovator is the one who will have to support his case. When the new seeks to replace the old, the burden of proof falls upon the new. And we are passing the time when proof could consist of appeals to common sense and reason. The argument that "it just stands to reason that . . ." is losing its strength. As education costs rise, more and more people are going to insist (and rightly so) on hard evidence to support the inauguration or continuation of any particular school practice.

This situation suggests to me two things that must be heeded by those attempting to bring about educational change. The first is implicit in the foregoing discussion: reasons for any practice must rest on empirical evidence. We simply can not afford to base a practice on common sense, faith, or authority alone.

The second grows out of the first: there must be greater sophistication in the interpretation of data. In this regard there are some common pitfalls, and I should like to enumerate and comment on some of them.

One frequent error is made in interpreting the meaning when we find a correlation existing between two or more phenomena; the tendency is to confuse the issue by assuming that the empirical relationship is a causal relationship. Simply because two events occur or vary together, we tend to assume that one causes the other. But this just "ain't necessarily so." Suppose, for example, we find a high correlation between I.Q. scores and scores on a standardized social studies test. Does the high I.Q. cause the other score to be high, and low I.Q. the low social studies score? Maybe not. It is quite possible that scores on both tests are highly contingent upon reading ability; a third factor may be the cause. In research it is usually possible that some uncontrolled, maybe even unknown variable might be subtly at work, either influencing both of our primary variables or in some other way confounding the data.

A frequent source of this sort of error in educational research is the so-called Hawthorne Effect. It is particularly likely to enter into the picture in what has come to be called "action research." Simply stated, the Hawthorne Effect refers to the fact that humans in an experiemental situaion tend to respond to the novelty of the situation itself, as well as perhaps responding to other aspects of the experimental change, e.g., language labs, programmed instruction hard-ware, etc. Invariably you will find that early reports show much more glowing results than do reports coming after the practice has become standard rather than experimental. At least part of this must be attributed to a Hawthorne Effect. The moral of the story is obvious: don't take research results at face value.

A somewhat similar confounding variable is the Experimenter Effect that Rosenthal has been studying and describing for the past few years. It has been shown that with both lower animal and human subjects, experimenters tend unconsciously and in extremely subtle ways to influence their research results in the direction of the experimenters' own expectancies. Psychological researchers obtain better learning performances from rats they believe to be bright than they do from rats they think dull, even though both groups of rats are selected randomly from a single colony.

Rosenthal showed also that teachers get differential learning outcomes from pupils, depending on what the teachers expect in the way of learning, even though there appear to be no differences in the teachers' instructional and other classroom behaviors. First graders even showed a marked spurt in I.Q. scores after a school year with teachers who had been told such a spurt was expected. (This was false information given to the teachers as being true; and, incidentally, the teachers did not do the I.Q. testing.)

Clearly, the Rosenthal work shows that the expectancies of the manipulators of other human beings affect the results of the manipulation; and the effect appears to be caused unconsciously and with no intent to deceive. It seems to me that this work has profound implications for educational practice. In this present context it helps to explain (1) why, in the case of the earlier-mentioned person who doubted the value of a practice, that practice is less likely to "work" for him; (2) why we can find spuriously high correlations between I.Q. and achievement; and (3) again, why we should not take research results at face value.

Another research sophistication needed is that of thinking in terms of multiple rather than single causality. In order to cope with a vastly complex world, we humans try to simplify it. As a result, we invariably over-simplify many things and resort to thinking in single cause ——→ single effect terms. But nothing in human behavior is really that simple. Surely this is the reason that no clearly best teaching method has been found for any given instructional purpose. Effective teaching, ill-defined though it still may be, is an interaction of method, content, pupil characteristics, teacher characteristics, physical setting, and probably other variables. This notion of multiple causality must be considered not only as an aid in conducting and understanding research, but also as a caution against instituting any educational practice that reduces things to "the one best way."

One other note of confusion in understanding research results should be noted. Commonly used in reporting such results is the word "significant." If one does not realize that this means statistically significant (that is, a finding that very probably cannot be attributed to chance alone), he can be badly misled. A research study can report results that are statistically significant, but whose practical significance to the field of education may be totally lacking. For example, one study reported a significant correlation between foot size and I.Q. The relation apparently really exists; it cannot be attributed to such things as sampling error. Yet it is an extremely low correlation and appears to have no practical application so far as school is concerned.

While on the topic of educational research, the growing separation between researchers and practitioners should be noted. In my opinion a major barrier to mutual understanding lies in the languages used. Each has developed his particular jargon that effectively blocks communication. Especially this is true, I believe, of the educational researcher, whose specialties do tend to become esoteric and whose terminology must appear hopelessly forbidding to the teacher or administrator already overloaded with the nuts-and-bolts problems of keeping school. I'm not sure what the answer is to this problem. Perhaps school districts or areas need a specialized person who understands both worlds and could bridge the gap; but such rare birds are hard to find and even harder to keep.

Turning more explicitly now to the matter of instituting educational change, let me speak to a question that is frequently raised: Where should the impetus for change originate? Should school board or administration take the initiative? Should it be the teachers?

In my judgment, it does not matter much who originates the ideas. There are successful innovative schools where the original push came from teachers, and others where administration took the first initiative. The really critical factor is, I believe, that at least a solid core of competent teachers be convinced of the advisability of the moves being taken. Board and administrators must, of course, be at least willing to allow change; but the surest road to failure is to invoke changes when the teachers generally are in opposition.

The great danger to practices inaugurated by decision of the administration is the probability of a lack of teacher commitment to something handed down from above. Too easily administrators can forget to consider how things look to the teacher. In one's enthusiasm for a new idea it is easy to assume that others will be equally enthusiastic and to act accordingly. Then, especially in a school system where communication between teacher and administrator is difficult (not exactly a rare situation), resistances set in. In many ways--a negative comment here and there, an undermining in a small way of this or that practice, much only half-deliberate or less--this kind of resistance can scuttle a program before it gets under way.

Whoever the persons who attempt to initiate change, they should beware of moving too quickly for another reason also. This notion refers back to the earlier discussion of data that appear to say more than they really do. By too quickly accepting somebody's hard sell on the basis of casually mentioned evidence, many schools have found themselves in possession of useless programs and equipment. In these cases, it seems to me that there are only two probable outcomes, neither of them happy. On the one hand, teachers might have taken the idea seriously and enthusiastically gone to work on it. But, it is a bad idea, it fails, and the teachers are left understandably soured on things and less likely to accept a really good idea that might come along next week. On the other hand, there might be a demonstration, a purchase, a vague comment that the teachers can easily put things to work; and not only because the idea was bad, but also because the teachers were taken for granted, nothing constructive really happens. In both cases the end result is a group of more jaded and skeptical teachers and a shelf full (or a roomfull!) of hardware gathering dust.

Situations like the preceding are only one of the reasons that school personnel are often reluctant to depart from tradition. There is the general human resistance to change that was discussed earlier;

but there are some more particular reasons, arising at least in part from the nature of traditional teaching roles, that teachers frequently need more than gentle persuasion in order to be convinced.

For one thing, teaching has traditionally been a solitary endeavor--solitary, that is, so far as adult companionship on the job is concerned. The classroom is the teacher's sanctuary, and that's just the way some want it to remain. But many of the changes being worked in schools are removing all that privacy; this exposure of oneself to the gaze of fellow professionals poses a temporary threat to most teachers. To some, it is an immense threat and not temporary at all.

Also there remains the often mentioned possibility that some teachers might be replaced by some sort of "machine." (At this point, I shall not speculate on whether this might not be a good idea in some cases!) Despite the many earnest promises that teachers will not be replaced, but rather will be freed to do more creative things, the fear of becoming superfluous still persists. And the promise of freedom to be "creative" must in itself be threatening to some teachers. After all, the model that may of them follow in instruction places a premium on the stereotyped and the routine. Lose the routine and the whole world is topsy-turvy. And before we judge them too harshly, let's face a difficult fact. Most of us, if we really had to be very creative very often, would be in a bad way. Do you still think that the promise of freedom from routine can't be a threat?

Still other teachers can be expected to defend tradition in the classroom because they have put so much of themselves into it. Consider the fact that some of the most innovative teachers are doing things that could have been done at almost any time in the past. For the traditional teacher who has spent 40 years in the classroom, any recognition of the superiority of the innovative procedures is that much negation of his very life. He must admit that in some degree he has lived in vain. Unconsciously, at least, every one of us must find ways of defending ourselves in such situations.

Another deterrent to innovation that must motivate some teachers is that the innovator can be a threat to his colleagues and thus risk their rejection. Evidence indicates that for many teachers, acceptance by colleagues is an important motive. To risk rejection is a serious matter. Why is there such risk? For one thing, consider the preceding paragraph. The innovator is in effect telling the traditionalist that he is all wrong. That's a risk! For another reason, innovators generally work harder (even though, we stoutly assert, they enjoy it more). This in itself will alienate some colleagues. Add to this the possibility that the innovator might become the administrator's "pet," the chance that he will be more accepted by pupils, the probability that the instructor in his graduate extension classes will smile upon him, his being singled out for student teacher assignments by colleges and universities, and other such side effects. It becomes apparent that colleague rejection is a real possibility.

Also resistance from some parents and students may be a deterrent to teacher change. Many of them do want school to remain what it has been. (Have you read the book, The Way It Spozed To Be?) And this kind of pressure may be just enough to make the difference in the decisions of a teacher who wavers between the old and the new.

Finally I should like to mention some problems accompanying innovation that might stem from the innovative practices themselves--cases of things that can defeat their own purpose for existence. One such problem occurs whenever any given procedure attempts to force upon a teacher a role that does not "fit." It is very easy to overlook the fact that teachers are individuals who differ among themselves even as the students do. And there may be vast differences in the teaching styles of equally effective teachers. When there is an attempt to squeeze from the teacher a set of teaching behaviors that are not congruent with that teacher's own authentic self, decreased efficiency and difficulties are almost certain to arise.

Another problem lies in the difficulty of organizing school in such a way that attempts to individualize make it more and more difficult for the teacher really to know the students. As we move away from the traditional, largely self-contained classroom, we expose teachers to larger numbers of students for shorter periods of time; as a result, it becomes more difficult to fit the instruction to each individual learner. I believe the problem is avoidable, but we need to approach practices such as team teaching with eyes open to the possibility of the problem's occurrence. Also an attendant difficulty can be that as students are maneuvered about, we can deprive them of the emotional "home base" that a one-teacher classroom can provide.

Of the problems arising from technology and gadgetry I shall make only brief mention. A full and lucid discussion of this matter is provided by authors Anthony Oettinger and Sema Marks in Run, Computer, Run (Harvard Studies in Technology and Society). They cite examples of frequent hoaxes perpetrated by the hustlers and con men of the "edbiz" world. In surveying a number of current programs employing hardware they find evidence of results such as the following: instead of freeing teachers from routine, the program may further bog them down with clerical work; individualization becomes mass regimentation (they quote one laboratory guide, "No one is an individual in the laboratory."); a new set of inane rules is substituted for the old; many programs are just expensive mechanized ways of doing what can be done more efficiently by teacher or textbook.

It should be emphasized that these authors are convinced that educational technology holds promise for the future. What they expose is not the total failure of technology but the mistakes, honest and dishonest, that are occurring in current attempts to employ technology.

It seems to me evident that hopes of systems analysts to build a "teacher-proof" curriculum will continue to fail. The basic problems of any educational endeavor are problems in human relations; the technical problems, although they certainly exist, are secondary. And systems analysis and technology fail in solving human problems because they attempt to treat as objective those aspects of human behavior that, at least thus far in the history of man, have remained subjective and highly personal.

Thus we need to look very skeptically at what Joseph Featherstone has called "the gimcrack prophets from the edbiz industries." Is a humane technology possible in American education? It probably is, but we are some distance away from its perfection.

It seems appropriate to conclude by again quoting Joseph Featherstone, who wrote in a recent issue of *The New Republic*: ". . . the threat is never simply from technology; the threat is people capable of treating other people as machines. School systems are already treating students and teachers as though they were machines. That is the source of our troubles, and that is what has to change."

THE STRUCTURE OF SCHOOL SCIENCE PROGRAMS

John W. Renner
Professor of Science Education
University of Oklahoma

When a child enters school he is probably egocentric, perception bound and able to think only in terms of concrete objects and/or experiences. Between the age of school entry and approximately fourteen years the child's thinking undergoes a transition from the concrete to the abstract. Those years represent a time when most children are in school. The function of education, then,[1]

> . . .is to guide the children's development by providing them with particularly informative and suggestive experiences as a base for their abstractions.

If the school is to assist children in making the transition from concrete to abstract thinking, it must select learning experiences which permit and facilitate that transition.

The thesis of this paper is that the discipline of science properly structured and taught can assist children in developing the ability to do abstract thinking. In evaluating that thesis, the nature of the discipline of science must be considered, i.e., the integrity of science as science must be maintained. Also the purposes of education must be analyzed to ascertain whether or not using science in the schools to develop abstract thinking allows those purposes to be achieved. The learner must be analyzed to determine if experiencing science as science is compatible with his basic mental-development patterns. Finally, the structure of classrooms, the classroom behavior of teachers and the materials needed to teach science in such a way that abstract thinking will result must be considered.

Science

The science taught in the schools must be true science; it must not be the technology which science makes possible (as extremely important as technology is) nor must it be the history of science (as interesting and intellectually challenging as that field is). If children are to learn from science the structure and the values which underly it, they must experience true science and not the areas which it supports or that support it. But what is true science?

These answers to the foregoing question are many and varied; consider these.

1. "Science has its origins in the needs to know and to understand (or explain), i.e., cognitive needs."[2]
2. "The primary purpose of science has little to do with weapons or washing machines; it is just to know and to understand."[3]
3. ". . .rapidly moving fields (of science) are fields where a particular method of doing scientific research is systematically used and taught, an accumulative method of inductive inference that is so effective that I think it should be given the name 'strong inference'."[4]

These three quotations all emphasized a common notion; i.e., the structure which permeates all of science is one of inquiry. The purpose of science, then, is to enable the inquirer to know "something", to understand what that "something" means, to know how he found out the "something" he knows and to be able, through inductive inference, to find "something else" related to it. The values which accrue to the inquirer through the process of inquiry are, first, the understanding he has developed. Those understandings represent the facts, principles, and generalizations of science that make possible jets, washing machines and other technological developments. Such understandings, or products, represent what the populus calls the progress of science and to many science itself. There is no doubt that without such scientific products the public support of science would be something less than it presently is. To many persons teaching science at all educational levels the products of science represent its content. As evidence that this latter statement is true, consult many of the existing textbooks, films, and other teaching materials that are presently available to science teachers. Those teaching materials were designed to explain the product-side of science to the reader and convince him that those products are true and important to know. But teaching science from a product frame of reference neglects what the previous three quotations emphasized as being the true structural framework of science; i.e., inquiry. Science produces products but the common thread which permeates all science and makes possible product production is the ability of the investigator to use inquiry. The second value, then, which the scientist making an inquiry gains is the understanding of how to inquire, the understanding of how to find out. To the educator, finding out how to find out is learning how to learn.

In summary, the discipline of science has two distinct phases; one phase is represented by what the inquirer finds and the other phase teaches him how to inquire. If, then, science is to be taught as science in the schools both phases must be represented in the classroom. For too long science has been taught as a set body of scientific products which the learner must know.

Educational Purpose

Earlier in this paper a statement by Robert Karplus was quoted which says that the primary function of education is to provide ". . .particularly informative and suggestive experiences. . ." as a basis for the guiding the learner to change his thinking patterns from the concrete to the abstract. Maslow claims that in order to lead the learner to think abstractly,[6]

> There is no substitute for experience, none at all. All the other paraphernalia of communication and of knowledge -- words, labels, concepts, symbols, theories, formulas, sciences -- all are useful only because people already know experientially.

Maslow contends that words used between persons have their place but that they have a limiting value unless both parties have had a common experience. He makes his point vivid with this example[7]

> Daughters must wait until they themselves give birth before being able to "understand" their mothers and be fully friendly with them.

Experience, in other words, provides a basis for leading a learner to do abstract thinking. But if the school must provide experiences which lead the learner to develop the ability to think, such experiences must certainly dominate the entire curriculum. A learner who is to develop thinking ability must have those experiences in all areas of the curriculum and not just one or two; such a situation would leave him confused as to what was important in the school and certainly not use the school's potential of providing opportunities to develop his thinking ability. Before the notion that the school should provide an experiential base for developing the ability to think, two questions must be asked:

1. Does developing the ability to do abstract thinking represent a defensible goal for the schools?
2. Can the traditional goals of the schools, e.g., the Seven Cardinal Principles, be achieved by organizing and operating schools as institutions which concentrate upon providing an experimental basis for abstract thinking?

In addition to these two questions there remains another factor which must be fully understood; that factor is what is meant by thinking ability. But before operationally defining thinking ability, we must agree that any definition of it is meaningless unless individuals are permitted the freedom to think and encouraged to do so; they must have the[8]

> . . .liberty to do and think many "things", but perhaps all of these things will be included if we simply say that true freedom provides the individual with freedom of choice.

Before an individual or group of individuals can exercise freedom of choice, they must be able to act in a rational manner; they must, in other words, have developed the rational powers of their minds. Those rational powers have been characterized as[9] " . . .the essence of the ability to think," and have been defined as[10]

> . . .the processes of recalling and imagining, classifying and generalizing, comparing and evaluating, analyzing and synthesizing, and deducing and inferring.

Here, then, is an operational definition of thinking; i.e., the ability to use the rational powers of the free and unshackled mind. Our society can certainly not survive if we have citizens who cannot so function, because our entire culture rests upon the premise that individuals can and will make intelligent choices; use of the rational processes makes such choices possible.

The two questions regarding whether or not the goals of the schools should be oriented toward the development of thinking ability and if such an orientation would permit the achievement of the traditional educational goals can now be answered. The Educational Policies Commission (EPC) answers both of those questions in this manner[11]

> The purpose which runs through and strengthens all other educational purposes -- the common thread of education -- is the development of the ability to think. This is the central purpose to which the school must be oriented if it is to accomplish either its traditional tasks or those newly accentriated by recent changes in the world. . . . it must be a pervasive concern in the work of the school. . . .but this particular objective will not be generally attained unless the school focuses on it.

Thus, according to the EPC, the development of the rational powers not only represents a defensible goal for the schools to focus on, but represents the central goal if the school is to achieve any task, recent or traditional. If the Seven Cardinal Principles are critically reviewed,[12] the reviewer will immediately see that the rational powers must be developed before or simultaneously with those Principles before an individual's behavior is changed.

Acceptance that the basic structure of science is inquiry and that the central role of the school is to develop the ability to think, as defined by the rational powers, deftly characterizes the structure of school science programs and their teaching. Those programs must embrace the premise that science is essentially investigation and must be taught as such. The content which is selected must permit the learner to investigate and provide him experience which will continually provide him a basis for the development of abstract thinking. As Maslow said, the words, labels and other paraphernalia of communication must not be allowed to substitute for learning that can come through investigations.

A teacher who is committed to leading his students to develop their ability to think has a particularly acute responsibility. He must look at the science area for which he is responsible and select that content which will allow investigations to be done and when completed will accurately portray the discipline. The curriculum will still be organized around the concepts which are to be understood, but the teacher must concentrate upon the inquiries the student must make to develop an understanding of the concept. If, for example, the learner is to develop the rational powers of classification, analysis and synthesis, he must make investigations which will provide him data to classify and analyze and from which an hypothesis can be synthesized. In other words, the rational powers are more than a statement of educational purpose; they represent criteria to use in the selection of content. When the rational powers are so used, however, they are also assisting the teacher in establishing science as inquiry, which is its basic, essential nature.

The administrator who accepts the development of the ability to think in learners as the central role of the school has taken the first step toward achieving excellence in the science program in his institution. He has identified for himself the role of colleague of the science teacher who is concerned with making his classes (at any grade level) centers of inquiry. Robert Schaefer contends that such a role is an unusual one for the administrator because[13]

> . . .there is little tradition of colleague authority, and the administrator rarely believes that his judgements should be questioned by mere underlings.

If the administrator is concerned about developing the rational powers of the learners in the institution he heads, he will encourage the science teachers to organize the curriculum around an inquiry structure, provide them the freedom to test various curricular arrangements and sequences, not be overly concerned with classroom noise, allow them the time to consult with other science teachers, science educators and scientists who can assist him, and, provide him with some financial freedom to acquire the unusual and the unforeseen. The administrator can be the central, driving influence which will encourage a teacher to truly implement the activities necessary to rational-power development, or he can be the indifferent and/or rigid person who will frustrate and discourage a teacher from trying to teach science as science. In view of the established purposes of education there seems little doubt about the path the creative, concerned, dynamic administrator will take.

The Nature of the Learner

Every adult who has had the privilege of working in the schools from kindergarten through graduate school has had a frightening experience. He has seen curious, verbal, eager-to-learn, questioning, gregarious, trusting individuals turned into game-players, teacher-studiers, haters of learning and school. In other words, the educational establishment has taken the natural characteristics of the learner and, through a process of making him adhere to the line, frustrated his national instinct to inquire. That the proposed structure of science teaching utilizes the natural characteristics of curiosity, questioning and gregariousness is immediately obvious. In order, however, to convince learners that those in charge of the school are really serious about utilizing their natural characteristics, they must be allowed to be curious, gregarious and questioning. Being curious is one thing, but can learners in pre-collegiate educational institutions profit from such freedom? Does the individual have an intellectual development pattern which demands that learning, to be fruitful, be experiential?

The Swiss psychologist Jean Piaget[14] has for many years recorded data on the learning patterns of children from birth. His data have led him to propose that when a child enters school he is perception bound, egocentric, centers on one aspect of an event, situation or object, cannot do reversals of his thinking, and, in general, lives in a world which is very rigidly defined by the child's perception ability. The child, in other words cannot think about his own thinking. This stage of intellectual development Piaget has defined as pre-operational; i.e., a stage in the child's development before he is able to perform mental operations. His experiences at this stage must be basically confined to observing and telling about what he observed.

Around age seven, the child begins to lose his rigidity of thinking and can do mental operations with concrete objects. This stage Piaget has called concrete operational.[15] During this period of development the learner can begin to do mental reversals; he can, for example, see that if a quantity of liquid is poured froma short, wide container into a tall, narrow one, that the amount of liquid is not altered; in other words, a concrete operational child thinks about his thinking. The child can made an investigation, take the information into his cognitive structure, and do mental experiments with that information. Thinking in the concrete operational stage becomes much less rigid.

One important characteristic about the concrete operational child, which is of the utmost importance to schools, is he can do mental reversals, he considers all aspects of an investigation and loses his tendency to be perception bound only if he is sllowed to work with concrete objects. If actual experience with the objects is not provided, the child is likely to revert to the rigid thinking patterns of the pre-operational state. This immediately says that if children in the elementary grades are to be taught science, they must be allowed to make investigations with actual concrete objects. This characteristic of the concrete operational child distinctly says that he can be led to begin uncovering the basic structure of science, i.e., inquiry. Pre-operational children can also be led to begin to develop the structure of science even though all a pre-operational child can do is make observations and report them. Certainly making observations is an important, perhaps the initial, step in the inquiry process.

Children will probably pass from the concrete to the pre-operational stage naturally, perhaps even without school experiences as we understand them. Evidence is beginning to be found, however, that children enter into the concrete operational stage more rapidly and more deeply when they have been taught science in the first grade from an inquiry structure.[16]

The last stage of the intellectual development process which Piaget has established is called formal operations. At approximately 12-14 years of age the child begins to enter a stage when he is able to think in the abstract. He can, in other words, formulate hypotheses which are completely abstract and absolute mental extrapolations of what he has already found out. He can think not only in terms of the actual objects which he has in front of him, as the concrete operational child does, but he can mentally manipulate variables which permit him to ask the what-would-happen-if type of question. The ability to do abstract thinking is, according to Karplus, the objective of the school and which represented the starting point of this paper. Maslow[17] provided the explanation as to the type of educational experience which learners must have in order to do abstract thinking when he explained that words, labels, theories, and other forms of abstraction are valuable only if people know experientially.

If the ideas of Karplus, Piaget and Maslow are combined, the resulting combination says that abstract thinking must be an educational purpose (Karplus), learners will eventually be able to do abstract thinking (Piaget) but such abstract thinking will not result if experience is not provided which encourages and promotes abstractions (Maslow). Such a summary says that a learner will not pass into the formal operational stage unless he has experience in inquiring into the abstract nature of "things." This situation represents a unique and profoundly important opportunity for science teaching; teaching science from an inquiry structure not only allows the learner to develop an understanding of scientific concepts and the structure of the discipline and develop his ability to think but also aids him in passing into true, intellectual adulthood, i.e., the formal operational stage of development.

Classroom Structure and Teacher Behavior

In our educational system science is taught by teachers and in classrooms. The structure of an inquiry-centered classroom, however, is quite different from one in which the teacher views his primary responsibility as the transmission of information about science.

The inquiry-centered classrooms teacher believes that concepts which are developed must be developed by the learner. He, therefore, feels that the center of attention of the learner must be the investigation he is making. This teacher also believes that children learn from each other and at the close of any investigation asks the learners what they have found. Such information can be listed on the chalk board and the learners are free to interact with each other regarding that information. An inquiry-centered science teacher believes that an essential part of the learning process is interaction between student and teacher and student and student. Data from an investigation spread across the chalk board represent a focal point from which a profitable interaction can come. In order to get data from the entire class on the chalk board and make it available to each class member, the teacher's role often becomes that of class secretary. In such sessions, however, he realizes that rational powers are being used and developed. In fact, he selected the particular investigation being used to encourage the interaction which occurs between the learning experience and student and student and student and the resulting rational power development.

Room arrangements are of the utmost importance to an inquiry-centered teacher; the room with the greatest flexibility is the one which interests him. Flexibility of room arrangement allows him to arrange it in a manner that will encourage and facilitate the maximum interaction among the students and to make the most efficient use of the room during investigations. Noise in the classroom does not particularly concern an inquiry-centered teacher. As long as the noise is production oriented it is accepted as an essential part of the investigation. Such an environment[18] could be described as[19]

> . . .a classroom in which sometimes the teacher talks, sometimes the student, sometime no one; . . .one in which motion is as welcome as stillness; one in which error is accepted as a natural and useful part of learning.

The requirements of the situation shape the environment of the classroom.

The foregoing quote implies that teachers in an inquiry-centered classroom which is devoted to rational power development in the students accept errors. Such is definitely the case. If a learner is making an honest attempt to solve the problem under consideratinn the answer he gets and gives is accepted by the teacher. That does not mean that the teacher allows such an answer to stand. If only one learner has developed a misconception, usually his classmates will assist him in straightening out this error. But if many in the class or the entire class has developed an erroneous notion, the teacher must now devise an alternate method of thinking about the problem or conducting the investigation. When an answer different from the first is obtained, the learners are in a potentially-rich learning situation; i.e., they must compare, analyze and evaluate each investigation and determine which they believe to be valid. Then, of course, their decision must be checked with a new investigation. Inquiry-centered teachers accept all errors as natural and valuable.

Questions are an important part of the repertoire of the inquiry-centered teacher but he does not ask questions to see if the learners "know" the answer - convergent questions. Rather, he asks questions to stimulate thinking, guide an investigation, employ imagination or give a clue to the direction the investigation should take; i.e., he asks divergent questions. This teacher asks few questions which can be answered with a "yes" or "no" because those are convergent.

The materials necessary to conduct the investigations must be present. An inquiry-centered teacher must decide upon the necessary materials when he selects the investigations to be done. Then, with the cooperation of the administration, these materials are made available to the young investigators.

The inquiry-centered classroom has two roles - the teacher and the learner. The responsibilities of each of those roles could and can be pictured as follows: [20]

Teacher	Learner
1. Provides the topic to investigate.	1. Does the investigation, i.e., collects information.
2. Asks for the information collected.	2. Tells what was found.
3. Accepts the findings of the learner and urges him to search for a pattern in the information collected.	3. Searches and (maybe with guiding questions) finds a pattern if one exists.
4. Questions about the relationship of the pattern found to the topic being investigated.	4. Generalizes and forms a concept.
5. Questions about the concept just formed to concepts formed from previous investigations.	5. Broadens his understandings of scientific principles and the structure of the discipline.
6. Raises questions about the value, meaning and/or validity of the concept developed.	6. Defends the concept by devising alternate methods of testing its validity.
7. May need or wish to suggest additional ways of testing the concept.	

The inquiry-centered teacher is one who believes that teaching is guiding the learner to find out, learning occurs when facts and principles form conceptual structures, and that understanding has been developed when learners relate to the known the unknown. He does not believe that teaching is telling, memorization is learning, and being able to repeat on an examination is evidence of understanding.

The teacher just described knows that the learning process extends from observation to reporting and therefore encourages the learners to write down what they have found; i.e., he knows that talking about an idea and logically structuring it on paper can be vastly different achievements. There is, of course, a vast difference in the type of reporting that learners at various levels can do. A first grade child may circle "with a red crayon" the objects he has seen and the twelfth grader can provide data to demonstrate that the earth's gravitational attraction for an object does accelerate it.

In Conclusion

The structure of the discipline of science is a natural curriculum vehicle to use to lead learners to develop their rational powers. Furthermore, science fits the natural learning characteristics of children and adolescents. In order to allow the discipline to make its maximum contribution to the education of a child, however, it must be taught as it is structured; i.e., by inquiry. If so taught, not only will learners develop their rational powers and gain assistance in moving toward the formal operational stage of development, they will also learn a great deal of scientific information. Perhaps the greatest contribution which inquiry-centered science teaching has to make to the education of young people is it makes learning enjoyable and in some cases fun. What greater educational estate can we provide our students than teaching them how to learn and to enjoy it!

FOOTNOTES

1. Robert Karplus, *Theoretical Background of the Science Curriculum Improvement Study,* Science Curriculum Improvement Study, University of California, Berkeley, 1965.

2. Abraham H. Maslow, *The Psychology of Science*, Harper and Row, New York, 1966, p. 20.

3. Russel Fox, Max Garbundy, Robert Horke, *The Science of Science*, Walker and Co., New York, 1963, p. 3.

4. John R. Platt, "Strong Inference", *Science* October 16, 1964, Vol. 146, No. 3642, pp. 347-353, statement in parentheses was added by the present author for clarity.

5. Karplus, *ibid*.

6. Maslow, p. 45.

7. *Ibid.*, p. 46.

8. John W. Renner and William B. Ragan, *Teaching Science in the Elementary School*, Harper and Row, New York, 1968, p. 49.

9. The Educational Policies Commission, *The Central Purpose of Education* NEA, Washington, D.C., 1961, p. 5.

10. *Ibid*.

11. *Ibid.*, p. 12.

12. *Ibid*., pp. 5-7.

13. Robert J. Schaefer, *The School as a Center of Inquiry,* Harper and Row, New York, 1967, p. 67.

14. For a succinct review of Piaget's theories see, John L. Phillips, Jr., *The Origins of Intellect: Piaget's Theory*, W.H. Freeman and Co., San Francisco, 1969.

15. Some authors, Phillips for example, refer to the pre-operational stage as a substage in the concrete operational period.

16. Donald G. Stafford, *The Influence of the First Grade Program of the Science Curriculum Improvement Study on the Rate of Attainment of Conservation*, Unpublished Doctoral Dissertaion, University of Oklahoma, 1969.

17. Maslow, Ibid.

18. For a complete description of the teacher's role and the learning environment see Renner and Ragan, Ibid., chs. 7 and 8.

19. Introduction to the Elementary Science Study, Houghton Miflin Co., Boston, 1965, pp. 7-8.

20. Adapted from, John W. Renner, Using Inquiry in the Science Classroom, Educators Progress Service, Randolph, Wisconsin, 1969, pp. 8-11.

RECENT CURRICULUM TRENDS IN ENGLISH

Dr. Robert Hogan, Executive Secretary
National Council of Teachers of English
Champaign, Illinois

EDITOR'S NOTE: Dr. Hogan concluded the oral presentation of this manuscript with a parable which, in his opinion, was quite symbolic of what is happening in English today. We judge this to be a most appropriate illustration of the manuscript theme, therefore have included it at this point.

* * * * * * *

There was an Indian Prince who fell in love with an Indian Princess. The night before they were to be married, she became seriously ill and was dead by morning. He thought some fitting memorial to the princess was in order. Out of his grief and his love, he had erected a great marble sarcophagus and surrounded it with lawns so that people would come from miles around to see the sarcophagus and remember the pretty Indian Princess. As years went by he became dissatisfied with that and he had erected over the sarcophagus a huge pavilion with plants and shrubs and rolling lawns, and people came from hundreds of miles around to visit at the tomb of the Indian Princess. More years went by and he was still dissatisfied with what he had done, so he had erected a temple something like the Taj Mahal over the pavilion which surrounded the sarcophagus. Then he went back to being a Prince. A few years later the Prince went back to the temple, but he still felt something was wrong. Walking along one of the parapets and, looking down at it he said, "I figured it out, I know what's wrong. If you'll only get rid of the sarcophagus it will be just perfect." (As we look at what has been happening over the last two or three years, particularly out of the Dartmouth Conference, out of the re-discovery of Piaget, the re-discovery of Rousseau, too, if you would, we have finally come full circle and have remembered why we built the sarcophagus in the first place. And most of the curriculum reform that I see going on right now has the child very clearly in mind. I think it's a happy state of affairs.)

* * * * * * *

Anyone looking for something more or less unified in the "New English" is doomed to disappointment. Roots for curriculum reform and redirection in English are so spread that the only certainty for the time being seems greater diversity. More than twenty Project English Curriculum Centers, supported by the U.S. Office of Education, have completed their work and filed their reports. Many are now seeking widespread publication through new textbooks and textbook series. Each had its own conception or model for English. Only one or two were directed to cast a broad net over the entire K-12 sequence. Some were elementary in their focus, other junior high, still others senior high. Some worked on the entire English Curriculum, others only one or another component.

The other major influence on English teaching was the Anglo-American Seminar on the Teaching of English, held at Dartmouth College in the summer of 1966. This month-long seminar brought together articulate spokesmen for English and English teaching from the United States, the United Kingdom, and Canada. The agenda was to see what agreements could be raached on matters dealing with teaching our native tongue and its literature.

Unlike the Project English efforts, the focus at Dartmouth was not on a definition of English as a subject. Rather, the jumping-off point was clarifying the nature of the child, at least up through the tenth grade, and, given his needs and his potential for growth, careful attention to what English teachers _do_. The concern was more for teaching style than substance, more on how English, properly taught, can help children reach their full linguistic potential rather than on what areas of content are, by their very nature, important for all children to learn.

Out of the publication from these two distinct sources of ideas and materials and out of the conversations among teachers and the focus for the following seem to be principal areas of curriculum development and rethinking:

The Goals of Language Instruction: Any discussion about the "New English" almost invariably seizes first upon the _Teaching of the English Language._ If there has been a revolution in the teaching of English, here, surely, it has been most visible. Traditionally, the goal of language instruction was to "standardize" the language of the students, to "purify" it of non-standard or what were regarded as non-grammatical patterns in speech and writing. In some ways, the goals for grammar instruction have not changed materially. What most traditional grammar books set out to do was to present the students with an accurate description of the English language and to present lessons which would, it was hoped, increase the student's power and effectiveness in his use of language. The dissatisfaction with traditional school grammar stemmed from its failure to accomplish either purpose. Utterances were recommended which occur in the natural speech of no known speaker of the language; and for all the years of instruction that went into it, the impact of grammar instruction on speech and writing was virtually unmeasurable. The new teaching materials and techniques are designed to present factual information about the language which is indeed accurate. Most of the newer and more imaginative drills are intended to increase the student's power over language by giving him sequential opportunities in manipulating the various grammatical structures to see how they work, to see what alternatives there are for any one of them, and to see what different ways they go together.

A distinguishing feature of current language programs is their concern for studying the various forms and varieties of contemporary American English. Part of the intent is to dispell the myth that there is one "standard dialect" of spoken American English. (That myth persists even among educated adults who are old enough to remember the range of dialects among, say, our past four presidents.) Yet, if education is to prepare one for "life," the mark of the educated man is his ability to accommodate himself to a variety of situations including linguistic situations. What distinguishes the educated person from the person whom the schools have failed is not that the former speaks only "good" English, but that he can shift easily and comfortably among various levels and varieties of English.

And the mark of the uneducated man is not that he speaks a non-standard dialect, but that he can speak only one dialect, whatever it is. The trend in recent years has been away from approaching language atomistically and in terms of the frequency of individual errors. Rather than concentrating on avoiding what is "bad" and trying to stamp that out, the concern is on all alternate acceptable possibilities and the testing of their effect.

In the current social crisis centering upon civil rights, the search for identity, and ethnic pride, the challenge to the English teacher is particularly great. Although most English teachers, if pushed, would admit that they regard one of the appropriate tasks of the English teacher is that of teaching a standard dialect of English to his students, not all agree. Some believe that the responsibility of the schools should be to show all students the power and, in fact, the beauty of all the dialects of English, even those labeled "non-standard." Even if all teachers did agree on the former mission, it would be an impossible assignment particularly in inner-city schools. A child who has grown up in Harlem and sees little likelihood that he'll ever get out of Harlem is understandably reluctant to put much effort into learning the dialect that carries prestige in the wealthier sections of Manhattan.

If one of the legitimate goals of English teaching is to keep children in school (rather than contributing directly to the increasing dropout rate) and to keep children excited about learning, perhaps some of the most promising arguments in recent years have come from those who contend that our job initially at least, is to excite the child about writing in his own dialect and to offer him as beginning reading material transciptions of his own speech. No one has really faced the question about where to go from that point . . .

Another principal area of curriculum development and rethinking is: The Importance of Oral Language Activities: A cliche to which no sane person could long grant credence is that a quiet classroom is necessarily—or even possibly—a learning classroom. In no subject does this notion make less sense than in English. One goal of English instruction is increasing power over language and confidence in its use. The accomplishment of that goal rests on classroom activities that regularly involve young children and older adolescents in listening to and speaking to one another in natural settings and on issues that concern them. The stress here is on informal discussion or "talk" rather than on platform presentations, oral book reports, or the like. More and more we realize that childrens' power over language rests in part on their frequent opportunity to use it, beyond any instruction we may give them about the structure of language or beyond any analysis we may ask them to make of the language others have written or speak. Possibly as a result of the scholarly approach to literature during the previous decade (popularly referred to as the "New Criticism"), literature had become the object of silent, careful, close reading and frequent explication. More recently, the trend has been to return in part to the oral tradition in literature so that literature is not only the object of discussion. Both in the elementary schools and the secondary schools English teachers are extending their efforts to have literature presented aloud, to have the children themselves read it aloud. Literature, well read, becomes an exciting listening experience and an additional aid to the understanding of literature.

The Effects of Ability Grouping and Other Forms of Tracking on Achievement in English: It has been standard practice in many large schools--particularly where classes are large and teaching materials limited--to group students by varying measures of ability (past achievement, I.Q. scores, measures of aptitude), The intent was to reduce the range of individual differences and, presumably, to devise special curricula for abler and for weaker students. Because of the bias in some of the screening instruments, the net effect, at least with respect to linguistic development, has been very often to isolate the students by social backgrounds and thus by dialect groups. It is a matter of debate in the profession now whether, during the current social crisis involving civil rights, the search for racial identity and for ethnic pride, the school can or should attempt to impose on all children a dialect pattern that carries prestige only in the white middle class community.

That issue aside, however, the present setting is one that limits the disadvantaged child only to his own dialect and that of the teacher. At least for that child who wants to add to his linguistic repetory, this isolation makes that expansion unlikely, since it is the use of language and the imitation of others--rather than textbook instruction or workbook drills--that make language change possible. In the meantime, the same isolation permits many of the children born to families that speak a standard dialect to continue in the erroneous belief that there is something fundamentally defective or incomplete about non-standard dialects. The argument here is not against tutorial groups, carefully devised remedial instruction or seminars for able students. But within the English program there should be settings that bring together students from various backgrounds for study and discussion.

The Binding Concept for the Literature Program: The principles involved in the selection of literature for the schools have varied from period to period. Once, literature was used as the medium for teaching reading skills and as an instrument for moral education. More recently, it has been used as the medium for teaching what we regarded as our cultural heritage, either solely American, American with its roots in British, or the whole of Western civilization. Two difficulties become apparent. First, in our effort at coverage, we often sacrificed the very authors and works we thought to include as important. And, although this admission is more painful, it was often plain dull. How else can we explain graduating generation after generation of older adolescents already prepared to join the non-book-reading adult population of our country?

At least two trends are clear in recent efforts at redesigning the literature program in the schools. In many areas the only experience that the children in elementary school have had with literature was in the primary grades, before they were full-fledged readers. In those early grades, their teachers, even on days that weren't rainy, would read to the children--

poetry, fables, stories, and the like. But in general, toward the end of third grade when many children had mastered at least the fundamentals of reading, the curriculum called for their settling down to the business of "learning." They applied these recently acquired reading skills to learning about geography, history, arithmetic, and the like. Consequently, in an overcrowded curriculum, literature was pretty much set aside.

As a result of work carried out in a variety of curriculum centers and the increasing influence of college and university professors of childrens' literature, as well as the insistance of traditional scholars in literature, the vast variety of literature is being made available to children in schools as a regular part of the program. Accompanying this and part of the same overall trend has been the campaign on the part of the National Council of Teachers of English, the American Association of School Librarians, and many other groups to insist on the availability of libraries in all elementary schools.

With respect to the secondary school program, English teachers have long been concerned about the decline in reading among older adolescents and the consistent results from a variety of studies shown that most American adults simply don't read books at all. When they do, it is either purely informational or recreational purposes. We've become increasingly uncomfortable, too, with the strange parallel between the most taught book in the American schools and the most disliked books among American children and adults.

In response to those two recurring facts, the profession is turning its attention to the potential in engaging recent and contemporary literature. This is not to discount the commitment to cultural heritage, but rather a response to the fact that our exaggerated concern about that same heritage has had as its net effect, the cutting off of a substantial segment of the population from that very heritage. If the only reason for teaching a certain book is that if the children won't read it now, under our pressure, they may never read it, that's hardly a compelling reason. At the same time and as part of the same dialogue, teachers of English are more and more concerned about response to literature, rather than merely the quality of the literature. If a child reads, say, *The Loneliness of the Long-Distance Runner* and feels the need than to read even more books, that seems now a more desirable outcome than the child who reads, say, *Quinton Derword*, and feels even more strongly that "reading literature" is an unpleasant task.

Inevitably, however, when one moves into the field of recent and contemporary literature, particularly the kind of literature which engages the interests of children, one also moves into the issues of censorship and adult standards about what is appropriate reading for children or taxpayer standards about appropriate expenditures of public funds. During recent years, the high school students found virtually on their own and responded in almost epidemic proportions to books like *The Catcher in the Rye*, *A Separate Peace*, and *Lord of the Flies*. Although the first of these has been a matter of widespread concern and occasional banning, where adolescents do indeed respond to books like these, and where the curriculum confines itself to safe and sometimes stuffy novels from the last century, the gulf between the child and his interests and the school is awesome. Further, the availability of the pornographic, and the near-pornographic, and the wide-spread sexuality in advertising, in entertainment, and in virtually all aspects of popular culture is a fact. The English teacher increasingly sees as his mission the education of youngsters in a way that will permit them to cope with a certain presence of sexuality, rather than to insulate the student for a few hours a day from what is the prevasive element in his life. Time and again the National Council of Teachers of English has reiterated its stand that children ought to have access to a wide variety of books and an opportunity, particularly when the book is troublesome, to speak about it with an understanding adult. There seems no way to insure that youngsters won't read those books that sometimes trouble adults, . . .

The Mushrooming Interest in New Educational Media: In recent years there has been continuing discussion of film study in the English classroom, including a clear shift in attention from the purely "educational" film to the "art film. That is, for some children, particularly those whose reading abilities are weak, an artfully made film may well induce something quite like a "literary experience." Insofar as the English program is concerned in the education of the imagination and in developing aesthetic standards, the film seems to find an increasing role in the English program.

At the present time, schools are exploring the possibilities in film making as part of the English program. Since film study itself is finding a place in the English program, the students who make their own films seem to see all the more clearly the skill and the art that go into the films that they are shown. Beyond that, schools have lately been experimenting with the potential of film making as an adjunct to or a component in the composition program. In these schools a term paper need not be a ten or twenty page typewritten manuscript, replete with footnotes and bibliographies. It might just as easily become a series of still photographs, with interconnecting discourse. If, for example, a term paper assignment might include a study of a current community problem, the use of visual materials in such a report is not only appropriate but eminently sensible.

The Rapidly Expanding Interest in Humanities Programs: The arguments for such programs are various. Some argue that the combined study of art, music, and literature helps to insure that students understand interrelaionships among these art forms that are already present but often unknown to the students, as well as to most adults. Second, as the general school curriculum expands more rapidly than the school year or the school day, the limits of the time schedule loom larger and larger. As a consequence, some schools are combining literature, history, and perhaps other subjects into a program which telescopes the time that the separate subjects would require.

Difficulties are substantial. First, for one teacher to attempt the full range of subjects in some humanities programs would require more Renaissance men than the culture has produced in some centuries. Second, there is the continuing possibility that instruction in literature will be divorced from the other components of the English program--language, composition, oral activities, and the like. To do that would be to remove from an integrated

English program one of its most exciting components and, when it is properly taught, the wellspring of ideas for both writing and language studies.

Moreover, the currently increasing influence of behaviorism and the stress on measurable, behavioral objects, the affective parts of the school program run a serious risk of being regarded as "elective" or frills," something to fill out a time schedule if there is time, something attended to only after urgent budget items are cared for. The thought that this might happen to literature study is a matter of increasing concern among those who care about the English program.

CHANGES IN THE SCHOOLS:
IMPLICATIONS FOR LEARNING AND TEACHING MATHEMATICS

John F. LeBlanc
Indiana University

Today I would like to share some thoughts with you on the changing school of today and what these changes mean in terms of the teaching of mathematics K-12. I'm going to spend the time this way:

A. I will describe some of the forces of change in schools.

B. I will give a few definitions and some of the terms and phrases associated with some of the "new" organizational patterns.

C. I will identify a seeming conflict of forces in the schools.

D. I will describe the typical teacher as she views teaching mathematics.

E. I will describe the picture I see in teachng mathematics in the late 20th century.

F. I will describe the type of teacher that should be prepared to handle the challenge of the schools of the late 20th century.

G. Finally, I will describe what a teacher preparation program in mathematics education might consist of for the late 20th century.

A. Some Forces for Change in the Schools.

At no time in the history of education have there been so many strong forces attempting to direct the education of our children. I have categorized these forces into seven vectors.

1. First, each of the academic areas of learning has, in the past ten years or so, developed "new" content and a "new" list of objectives for the school child. Modern mathematics with its emphasis on understanding has challenged the previously existing practices of rote memorization of skills; the "cookbook recipes" approach. With this change we are all somewhat familiar. Science has placed an emphasis and involvement in problem solving; science educators too have challenged the factual memorization of scientific facts. Social studies has embarked on a conceptual approach, trying to unify the curriculum for children throughout the grades. Language, with its transformations and structural linguistics have sent several teachers back to college to study the new language. Other areas of the school curriculum claim equally important changes in their program.

2. A second recent force for change in the schools has been the methods associated with the new content. The discovery approach to learning has at once become fashionable and outmoded. There are levels and type of discovery depending on the author or educator. Pupil involvement and interaction are "in", the lecture or even teacher-directed activity is "out".

3. A third recent force for change in the schools is the many

new teaching tools that have arrived on the scene, in the past ten years. Television teaching gained great strength for a period of time and still needs to be considered as a potentially powerful tool. The use of the overhead projector, the tape recorder, and many electronic aids, while being potentially helpful, pose a problem for the principal and teacher. Other new materials, such as program learning, materials and kits, have added to the list of new tools. Each subject has a list of special materials for use by the teacher in conjunction with the curriculum.

4. A fourth recent force upon the schools which has caused not only change, but even agitation, is the arrival of federal monies which are designated for "special" programs. Many of the monies must be spent not for the implementation of existing programs (even though some may be good) but on innovations. The innovation syndrome has, in effect, taken control of the limelight, at least, if not the total energies of some school districts.

5. A fifth recent force upon the schools is the active interest shown by the university in the public schools. School districts are being beseiged by benevolent universities which have monies earmarked for public school cooperation and by doctoral students who have dissertations to write. Research, innovations and occasionally even disorder have resulted in the public schools from the universities' involvement.

6. A sixth new and over-riding factor has descended upon the schools; the push for organizational change. Team-teaching, non-graded,

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unitized, modular scheduling, middle schools, departmentalization, all have added to the confusion of direction in public school education. Many school districts have dropped the emphasis on in-service training in content and techniques and have concentrated on organization in the hopes that more efficient and more effective organization will provide the vehicle for a better instruction of the child. With the increase in enrollment and with the increase in educational costs, these organizational innovations have become the hope for educating more at a lower cost as well as being a more effective way of educating children.

7. The seventh force that has been felt by the schools is the pressure for change coming from the community. The professional educator's judgment, advice and leadership (like the politician) is being challenged by parents, teachers, students and various minority groups. This challenge is at once aimed against the curriculum, the organization, the boundary and bussing policies, and most of all, the cost of education.

B. Some Definitions and Facts Related to New Organizational Patterns.

The present activity in the schools has introduced a large number of terms and ideas that need to be at least briefly defined. I'm sure you all know these terms. Please bear with me as I review some of the terms used in educational organizations. In addition to this, some changes in society and the schools have occurred that bring about a need for some listing of a few related facts. The following is a list of terms and facts that are found in today's schools:

1. A sequence or a continuum - Many curriculum experts believe that the nature of several subjects demands that certain concepts, skills, processes or, in general, certain content be learned prior to another process, or concept or skill. [illegible] such is the case, the subject is said to have a sequence, or perhaps more accurately, that in learning the subject there is some sequential order in the learning.

2. Pacing - It is obvious that different students and even different groups can and do learn at different rates of speed. The rate or the pacing of learning has always been recognized as an issue which must be taken into account in the school. "If a subject has a sequence, that is, must be learned in a given order, it does not follow that all students must learn this subject at the same rate."

3. Types of learning - There are many different types of learning for students in the schools. A student may be learning a process, he may be developing a concept, or he may be acquiring a skill. These learnings are, for the most part, not well defined or segmented by the child in his early school life. However, the differences must be well defined in the curriculum presented to the child. These differences in the type of learning may determine differences in the setting and in the activities.

4. Values concomitant to the learning - In addition to the content learnings (whether it be a process, a concept or a skill) there are non-separable concomitant values that accrue from the learnings. For example, learning together may be an essential part of the content.

Or interacting with other pupils using content-oriented vocabulary may be a necessary by-product of another segment of learning. At other times, a child might well work alone on a skill to develop power. Depending on the type of learning, then, the concomitant values may be determined by the setting for the learning. Thus, the educational setting should not be limited by the learning of a process, or concepts, or skills in a given discipline or art. But rather the different types of learning need to be carefully balanced with the values concomitant to the type of learning.

5. Grouping - Students may be grouped in many ways and for different purposes. A graded random group is usually referred to as a heterogeneous group. Another group of students having been identified as having about the same achievement level in a particular subject might be grouped by grade in a homogeneous group.

6. Non-graded - Students may be grouped crossing grade lines or according to achievement in a subject and are then said to be non-graded or ungraded. In some cases, they are grouped ability-wise (perhaps achievement-wise) across grades. In other cases they are grouped in a random way across grades.

"Thus, it is difficult to talk about non-graded without specifying what sort of grouping is implied. Non-graded, by itself, does not convey a unique arrangement of students."

7. Individualization - The term individualization refers to the planning and teaching of curriculum to maximize the growth of each student.

The assumption is that students differein the rate and in the depth to which they can learn and grow. Individualization in its extreme sense would mean a different curriculum for every single student. In a moderate sense, individualization would mean keeping in mind that students are different and that constant care is taken through assorted classroom techniques to make all learners learn efficiently.

8. Self-contained classrooms - In the purest form, the self-contained classroom operates with one teacher totally responsible for a given number of students and their learning in all phases of curriculum.

9. Team or unit organization - In the broadest sense, this organization is composed of a number of teachers responsible for the total learning of all phases of the curriculum for a given number of students.

"In practice, many school organizations represent a compound mixture of a unit which is at once non-graded, attempting individualization in some phases and self-contained for other phases."

The list can go on to include departmentalization, the middle school, modular scheduling, and others.

10. There are a number of facts that should be noted concerning the logistics of schools:

a. There is a growing shortage of elementary school teachers and some secondary teachers and money. The public school teacher in the future will probably have to be responsible for more children, ratio-wise, than she is presently responsible for.

b. Certain schools, (such as inner-city schools) have been identified as having special problems and needing special solutions.

c. The forces of change upon the schools have placed an ever-increasing responsibility upon the teacher and administrator.

d. There are evidences of wider individual achievements and needs of students. The search for new curriculum, new organization that will supply a solution to these individuals has become a major preoccupation of school educators.

C. Conflicts of Forces in the Schools.

As a result of these various forces upon the schools, some conflicts have arisen. The curriculum expert and the teacher educator at the college have had the task of preparing a teacher to work in a fairly standard organization - the self-contained classroom or the five or six-section secondary school. The designing of activities, objectives, the preparation of a teacher were fairly well defined. The burden of work on the teacher educator was to refine the procedure to prepare the teacher for the job of teaching a fairly well-defined curriculum. The type of school, the type of pupil, the type of organization, the type of program in which the teacher might work was not a concern. Thus, the setting, the atmosphere, the concomitant values associated with the subject were not carefully defined since these seemed to be sensed **and learned by the sensitive teacher** without direct teaching by the methods teacher. It was left up to the local principal or supervisor to see that reasonable adjustments were made in the fairly standard program.

Again, providing for individual differences has been largely a function of the resourcefulness of the self-contained teacher, or the individual subject matter teacher, although the curriculum expert, through in-service workshops and curriculum guides has given many general suggestions.

On the other hand, the administrator connected with the elementary or secondary school, of late, seeing the complexities of demands by the curriculum experts for new curriculum and seeing the shortage of teachers, and seeing a need for more attention to individuals, has worked to effect better planning and better instruction for children. Thus, he has organized the school with a number of purposes and reasons in mind.

1. Students differ in ability and in achievement. Individualizing, or providing for individual differences is a current organizational drive.

2. Some teachers are strong in one content area and weak in others. A school might be organized to use the strength of the strong to help the weak.

3. Some see value in mixing multi-aged students together for instruction. A student learns from students of differing ages better

than from students of the same age is a claim made for a non-graded organization.

4. Students need to become more independent is the basis for organizing a school into a freer, less structured setting.

5. Teachers can plan more effectively together for a group than each planning in an isolated fashion.

6. Students are different today than in past years. They come to school more mature and sophisticated and can learn more, or in a different way, than students in previous years.

7. The tasks listed for the self-contained classroom teacher and the secondary mathematics teacher by the curriculum experts and the expectancies of achievement for students are too great to be handled by the traditional organization.

8. The technological advances in all fields of endeavor should not be ignored by educators. Teachers and classroooms need to involve themselves in a proper use of the new equipment. The traditional organization does not allow for such a transition.

9. Students demand a wide variety of experiences particularly at the secondary level that a six-or seven-period rigid schedule cannot accomodate.

10. The good self-contained teacher may be priceless, but the day when a teacher remains on the job for 20 years or so is over. Constant turnover and mobility are part of our teaching staff as well as our pupils. For greater control of and influence on new teachers some team organization

seems reasonable.

11. The national shortage of teachers questions the feasibility of continuing the standard classroom organization. Teacher aids and other adults will be needed to help the teacher who will be responsible for larger numbers of children. A different organization would better use teacher aides.

These purposes and reasons are a few that lead the administrator to reorganize the school. The overall purpose given, however, is that a new organization would provide for better instruction. Often, however, the changes in organization are coming about as a result of first looking at the learning to take place for a particular subject and then making the organizational revisions. The conflict or at least confusion is further generated between school administrators, teachers and curriculum experts in that not all variables such as how students learn, what are the best strategies for all students, what content is beneficial for all, for a few: these variables are not always carefully examined before organizational changes are made.

D. The Typical Teacher of 1969.

The elementary teacher of 1969 has been prepared as a general elementary school teacher. She may have had no other preparation to teach mathematics than a methods course. At worst, she might have spent only a few weeks in a general methods course. At best, she would have taken a couple of mathematics courses and a three credit course in methods. Whatever her preparation, the typical teacher follows the textbook with a fair amount of vigor. This is not said in any criticism of the teacher, since she also teaches six or eight other subjects. I would say, however, that she does not have a clear picture nor understanding of what she is trying to do in mathematics.

Some fifteen years ago if we were to ask an elementary school teacher what she was hoping her pupils would accomplish as a result of her teaching she would have answered in a fairly confident way that "The pupils were learning to add, subtract, multiply and divide whole numbers and fractional numbers." She might also say that some skills in measurement would be taught.

Asking the same question today brings quite a different if not confused answer from teachers. They do not have the clear picture that they once had. In answering today they might say something about "understanding" or about "sets" or "bases" or the "commutative property". Teachers should have a clearer picture of the objectives for a contemporary mathematics program. In the programs that claim to be better structured, it seems strange that a majority of teachers still think there is some mystique that surrounds the mathematics program in the elementary school. Some teachers enjoy success in the sense that the children enjoy the activities presented in a program in the elementary school. Some teachers enjoy success in the sense that the children enjoy the activities presented in a program or that they have learned from demonstration. But the overall direction, the overall picture of the program still escapes the teacher. From one point of view it can be said that one set of recipes has been exchanged for a new, more exotic set of recipes. It must be stressed again, that the teacher should not be held responsible for the gap in direction.

As this teacher is caught up in the elementary school changes, she is not equipped to make sound decisions concerning individualizing instruction, team teaching and the relationships of elementary school mathematics to the total program.

Let me give two examples, one from a nationally known program and one from an isolated building but one which could be repeated in several places.

A project of national importance has written behavioral objectives for the total mathematics program in the elementary school. As a child completes one objective and is tested for his comprehension, he goes on to another objective. He works in isolation. Seminars are provided. In a personal observation of these seminars I observed that they were drill session seminars. In questioning pupils, it was obvious that they had gone through the objective, accomplished the "bits" but they could not communicate with me about it. A child well into the study of rational number objectives could not talk with me about it - or use terms such as fractional number or even fraction! This program was designed by someone who apparently knows nothing about elementary school children - as are several - but that's another story! The teachers in this program did not know enough about mathematics to know that interaction, discussion and learning to communicate in mathematical language is an extremely important part, a concomitant value in learning mathematics.

In the other example, teachers of grades 1 and 2, upon the suggestion of the principal, put all the first and second grade children together. One year they would study materials from grade 1; the next year the new group of first and second graders would study grade 2 materials, even though the new first graders had never had the first grade materials! Fortunately 00% of even todays' teachers would not have made such a decision - I hope!

The secondary teacher of mathematics has been thoroughly prepared in higher mathematics. Most universities do not count any course prior to calculus as credit for a major. The teacher teaching 7th and 8th graders usually has the same preparation as one teaching 11th and 12th graders. Even with the "new" mathematics programs and the accompanying philosophy, the secondary teacher, as a rule, still views his role as teaching mathematics, algebra, geometry and other college preparatory mathematics. While many secondary teachers are willing to help the non-college bound pupil, neither their training nor the available materials are appropriate.

In addition to the standard mathematics courses, many teachers are attempting to initiate courses such as Computer Programming, Probability and Statistics, and so forth. Individuals and individual school districts are attempting to break the five-period a week lecture-exercise pattern but do so without help from national curriculum groups.

E. A Possible Picture of Mathematics Instruction for the Late 20th Century.

Whatever the grade, whatever the mathematics course, I see a great emphasis on content being organized, activities being suggested, materials developed and criteria proposed around a set of performance objectives. In other words, I see not only teachers but publishers developing units and objectives that are measured in a given way.

I know you are familiar with educational objectives - the broadly stated objectives that include such words as understand, appreciate, etc.

And I know you are familiar with instructional objectives which are specific if not the daily-type of objectives which use such expressions as "solve 5 out of 7" or "match the geometric figures with their names". The performance objective is somewhere between the educational and the instructional objective.

An example might be:

> At the end of this unit of study the students should be able to solve a system of linear equations.

or it might read:

> At the end of this unit of study the student should be able to find the quotient using a 5 place dividend and a 2 place divisor.

Such a unit is then developed by a series of instructional objectives for daily work. The student knows what he is to accomplish, what the result is to be. Compare this with the generally current practice of going through an Algebra I or a 5th grade arithmetic text page by page.

The units of study would vary in length and would be interrelated. How will students use these units? What will be the organization of such a school in which students learn in this way?

I do not pretend to know the answer but I do think some conditions and potentials can be stated.

1. Instruction in mathematics will be individualized in the sense that each student's progress in learning mathematics will be carefully recorded and prescription will be based on his past achievement.

2. I do not, on the other hand, see each student learning in an

isolated fashion at all times. I see groups of students working together. At times, these groups are generated by the students themselves; at other times I see students being assigned to a group by a teacher who has assessed a given student's ability to fit and be an asset to the group.

3. The aids that are presently available will be better used with a more limited objective or unit than trying to fit an entire course objective. It may be that cassettes will be available with video tape. In any event, students will spend less time in formal classes and perhaps less time in a school building.

4. The teacher will become a master diagnostician, prescriber, and source of learning. Seminars and informal chats will be more prevelent than introducing or explaining a new problem or concept.

5. The teacher, much like the medical doctor, will spend more time with those who need help, not with children who are having healthy educational development. Some children may attend school for a few hours a week while others may attend many hours a day.

6. The units, particularly at the secondary level will include many more diverse topics than are presently included in the present list of courses and topics. Among those receiving much attention will be those related to probability and statistics. Certainly, topics of more interest to the non-college bound population will be included.

It is easy to make predictions when no one can prove me wrong at this point in time! Thus, I'll not dwell on any further forecasting but simply summarize this section by repeating that materials will probably be developed around specific performance objectives rather than around a year's work in mathematics.

F. What Type of Teacher is Needed to Teach in the Late 20th Century.

Since I am addressing a group of administrators I should start by saying that I can see roles for the principal of a building but none so important or necessary as that of the curriculum planner and curriculum supervisor. His time must be spent helping teachers make curricular decisions for groups of students and individuals.

The teacher, of course, is still the heart of the instructional team. A new elementary school teacher must have certain competencies. The basic characteristic of this teacher will be her ability and competency in making wise decisions concerning programs and organizations in teaching mathematics. I do not believe that the generalist whom we have trained in the past and as we have trained in the past can do the job today. Nor do I believe that schools (at least K-3) should be departmentalized. I would like to see some teacher in the building who:

1. knows enough mathematics to make decisions about programs and organization.

2. knows enough about how children learn mathematics to select and design appropriate activities for children.

3. knows what mathematical aids are available and how they might be used in mathematics labs.

4. knows enough about tests and measurement in mathematics to design evaluations of mathematical learning.

5. knows just enough about other subjects so that she could teach these subjects if she were a generalist.

At first glance this sounds unreal. I think it is very real, very possible. Obviously not all teachers should or could have such ability in mathematics. Some teachers should have parallel competencies in other areas. I stress again that all teachers should have the "basic training" in all areas of the curriculum.

If teachers are going to plan together, if principals are going to "non-grade" their schools, if other organizational patterns are going to be tried, then some teachers must have the ability and training to make a decision whether such an organization might be harmful to good mathematics instruction. The present general training of elementary school teachers does not generate this competent decision-making ability.

The secondary mathematics teacher needs to have more training in how students learn and not rely on the logic of mathematics as the basis for teaching-learning. Certainly the secondary teacher of the late 20th century must have the ability to work in a laboratory setting. Perhaps even more than the elementary school teacher, the secondary teacher needs to be a decision maker relative to the appropriateness of content for the individual student. This is not a criticism of the teacher but rather one of a system that has left teachers feeling that mathematics is only good if it is in the college-bound sequence. Such an attitude must change.

G. The Teacher Education Program.

If instruction is to change, teachers must change, and if teachers are to change, the teacher education program must also change. In preparing the elementary school teacher for the future in keeping with the competencies described above, the program must consist of two phases:

1. the generalist training
2. the specialist training

Since the generalist training is a subset of the specialist training I will describe that phase and continue on to the specialist training.

1. All teachers need to know the objectives of a contemporary mathematics program. While performance objectives may not exactly spell out everything we want for students, they do a better job than the mystique of "understanding of mathematics" or "appreciation for mathematics". Every teacher needs to know in performance terms what the goals of a contemporary mathematics program are - and the sequence in which they seem easiest and most appropriate to be attained. A look at the content strands (such as Sets, Numerals, and Numeration and Geometry and so on) and identifying objectives in a sequential order seems a must.

At the same time that they study these strands (or prior to such study) the teacher certainly needs good content courses in mathematics. The mathematics content courses for elementary teachers should be in closer alliance with the content that teachers will be teaching children. Many prospective teachers having 6 or 8 hours of mathematics involving a smattering of everything from Sets to Geometry are convinced that "modern mathematics" has an undefiniable mystique. Or worse yet, the prospective teacher thinks that defining the universe or naming all the subsets of a set is an appropriate activity for grade 2.

Whether these content courses are taught by the mathematics department or by the mathematics education department seems immaterial. But the content for these prospective teachers must consist of something other than "number bases", "modular arithmetic", or "$a+b = b+a$". The content courses need to be carefully fashioned in terms of performance objectives - teachers seem to teach as they are taught! It would not be inappropriate to teach, using as a reference, a sound elementary school program.

The secondary school teacher needs to be well founded in mathematics. But the mathematics taught should not be restricted to "pure" mathematics. Rather the mathematics courses should include those taken by elementary school teachers as well as courses such as finite mathematics and foundations of elementary mathematics.

2. What methods courses contain or should contain can be discussed at length. In view of the changing schools the general elementary teacher (as well as the elementary specialist and the secondary teacher) should have at least the following competencies resulting from a methods course.

1. He should be able to list some sequence of learning expressed in performance objectives. That is, given a student's grade or a point in the student's learning continuum he should be able to indicate what ought to be next in the child's learning. Such knowledge is essential for diagnosis of children's progress and subsequent prescriptions.

2. He should be able to identify some "need to know" concepts and skills, or "need to know" objectives as opposed to "nice to know". Every general teacher must make some decisions about students within his room.

Should the student do more work on this concept? Is this concept important from a long range view? If teachers are not trained to identify at least some of the important concepts as opposed to some of the trivia in the programs, the teacher will proceed in a page by page manner.

3. The use of mathematical laboratories or learning resource centers in mathematics are rapidly becoming part of the school picture. The materials appropriate for such a center as well as teaching tools and aids such as c counters, charts, the abacus and mathematical models should be a part of the teacher preparation atmosphere. It is just as appropriate to have a mathematics laboratory center for training teachers as it is to have a laboratory for science methods. My own observations as well as other professors who have related their experiences have found the laboratory experience in methods an excellent one. Role playing and other techniques are, of course, important. Teacher candidates need and use the language and the materials appropriate for young children. It goes without saying that methods courses that teach content only are misdirected.

There are other components of a general methods course. I am not trying to enumerate them all. The three points discussed here are essential in the generalist training, that is:

Learning the objectives, scope and sequence of a typical modern program;

Identifying some "need to know" as opposed to "nice to know" objectives;

Becoming familiar with the materials and aids for a mathematics resource center.

These are the three objectives a mathematics methods course should contain in preparation for today's school.

3. The training of the elementary specialist and the secondary mathematics teacher should, of course, include the same training as the generalist. There are programs for the specialist and the secondary teacher now. Usually these programs consist of more hours in mathematics.

I would agree that additional mathematics ought to be part of the specialist's and mathematics teacher's training, but not mathematics as we presently think of it being taught. There ought to be a course in probability, for example. But taking such a course as it is typically taught in some mathematics departments does not help the teacher a great deal in selecting programs, in making decisions about materials or even in teaching children. If probability were taught with activities appropriate for grade 1, grade 2, grade 6, grade 10 or taught in the same sequence as a student might learn it, then such a course would have a great value. Certainly the program for the specialist and secondary teacher ought to include more mathematics, but hopefully taught in a way more closely related to the way students learn.

Almost more important than the course work, however, is the mathematics education block of work. Such a specialist and mathematics teacher ought to know:

1. What research has to say about how children learn mathematics; about the theories of Piaget and Brunner and others. It seems as though there are certain prerequisites for learning in mathematics. Current research, for example, tends to support the notion that conservation of number, or

conservation of length or conservation of several ideas is a necessary condition for learning about number, or about length. The knowledge of such research, or at least its possible implications has a tremendously great potential impact on learning and problems in learning for young children. Being aware of such problems, hopefully, will make such a specialist teacher alert to possible methods of helping a given pupil with given characteristics indicating a lack of conservation.

2. What mathematics curriculums are pace-setters; which seem to reflect some of the current theories of how students learn mathematics. Some teachers _need_ to know about the current national and international efforts in program development which are taking place. They need to keep abreast of the literature in the field. Introducing them to the _Arithmetic Teacher_ and the _Mathematics Teacher_, for example, and hoping they will continue to subscribe to it is a means of helping them remain informed of efforts in mathematics education. They will identify key issues in mathematics education such as:

What should the geometry program be? What is the role of probability and statistics in an elementary school program? What kind of mathematics program is appropriate and/or necessary for students not succeeding in a standard program?

3. What practices in motivation, classroom management, building organizationnare most appropriate for mathematical learning. Having identified appropriate objectives for a school mathematics program in a _given_ school and in a _given_ community such an elementary specialist or a secondary mathematics teacher should be able to identify an appropriate organization for such an

objective. Perhaps some of the objectives need teacher directed activity while other objectives might better be done independently. The motivation and activities might well differ from school to school.

4. What types of action research are appropriate either alone or in cooperation with a university. Some research and measurement tools should be a part of the specialists's "bag". Such an elementary specialist and/or secondary teacher should be able to construct evaluative measures for the objectives developed within the building. Knowing the central needs and issues of a given school population the teacher could well conceive with university assistance many useful bits of research. These research studies might be immediately useful or they might add to the knowledge of basic research on how students learn mathematics.

These four objectives for the elementary specialist or the secondary mathematics teacher constitute the mathematics-education phase of the training which I believe the forces for change in the schools will necessitate.

The elementary specialist training and the revised secondary teacher training in mathematics demand that the while system of teacher training be revised. This revision really is not as dramatic as it might seem. This revision, however, is necessary. Perhaps there are other changes to be made in the teacher training program. Students have told us this at Indiana and I suspect from my experience and reading the papers, that public schools too have been advised to change! I do not know what the general solution of such a problem might be. I do propose the generalist-specialist program for the training of elementary teachers and the above described revision for the secondary teacher.

I have spent a great deal of time talking about teacher training to you, a group of administrators. I have done so with the belief that if change in a teacher training program is to come about it must be initiated by you in the public schools. The public schools have been ahead of the teacher training institutions in many ventures. Many changes occur by having in-service in a given district. The university professor learns more from an in-service session designed by the schools than what the teachers learn from him. Such an experience does have repercussions back on campus.

The pattern in the teaching-learning of mathematics is going to be centered about performance objectives. Students will learn as individuals and their progress will be charted as individuals. Teachers must perform different functions. To do so they must be trained differently.

The issues in mathematics-education are, I suppose, no different than any other issues in other subject fields except that they center about mathematics. We have just gone through a revolution in the school curriculum. We know that many topics can be taught. The question remains: What should be taught? Questions such as this and questions concerning the curriculum for various segments of a school population, must, in the final analysis, be decided by well-trained mathematics specialists.

It is important to note before concluding, that many mathematics educators are concerned with basic research in how students learn mathematics. A decade or so ago, the emphasis was on curriculum and curricular improvements. Today curricular improvements are still being made - as are organizational changes. But without a clearer picture of how students learn, what are the conditions for learning, the task of educating the student who is not learning by himself will not be accomplished.

Mathematics is playing an increasingly important role in our society for all citizens. The changes in mathematics instruction necessary for this challenge have been proposed. The task in carrying them out is a joint one between school administrators, teacher trainers and curriculum developers. The team effort between these three, following the findings of the researchers in mathematics-education should help accomplish these changes.

SEARCHING FOR MEANING - AN EMERGING MODEL FOR THE SOCIAL STUDIES

William E. Gardner

University of Minnesota

The current literature in social studies abounds with statements to the effect that a revolution has occurred in the field. Books, pamphlets, and articles in professional journals argue dramatically that a new day is dawning, that the revolution is in progress. Textbook companies and other media producers advertise in the pages of Social Education and Social Studies proclaiming with vigor that their products are based upon the popular principles of inquiry, induction, discovery and structure, and that they meet the special education needs of the disadvantaged and the advantaged alike. For their part, teachers are busily engaged in attending summer institutes and in revising curricula at the local level.[1]

There is no doubt that the last decade has brought a tremendous surge of interest and activity in the social studies. It is easy to become excited about these developments. After all, the social studies have long been identified by students as the most stodgy and irrelevant of the school's activities. To those of us who have labored in the social studies field the prospects of even minor changes (to say nothing of a complete and total revolution) are most intriguing.

Unfortunately, it is also easy to become confused and disenchanted about the "new" social studies. When one attempts to plumb the nature of the revolution one finds it difficult to document the precise direction in which the field is moving. One learns that the key slogans of the revolution--inquiry, structure, and so on--are for the most part ill defined in an operational sense. Too frequently, they are merely new jargon words replacing the vocabulary of past innovation. Furthermore, one is tempted to raise the question of how "new" the new social studies really is. Dewey's pronouncements on the social studies of 60 years ago and the seminal work of the Krey Commission in the 30's and 40's sound remarkably similar to statements dealing with the new social studies.[2] Then too, when an attempt is made to determine the extent to which the revolution has spread to and affects classroom practice, one learns that there is no hard evidence; in fact, there are disgustingly few data. One is left with the troublesome notion that the vaunted social studies revolution has been in reality only a palace revolt, that social studies educators and people in social science fields who are active in curriculum work become, like revolutionaries everywhere, convinced that their cause is just. But like most educational innovators, they have not as yet developed sophisticated techniques for proving their point in practice. What the field possesses in abundance is issues--great unresolved, and perhaps unresolvable issues. As a recent observer put it:

> In American education today, one of the wide-open areas of controversy is the field of the social studies. Objectives, the role of values, the nature of social realties and the character of the thinking process are being re-examined. The question of what knowledge is of the most worth is again being raised. The places of history and of the social sciences in the social studies curriculum are being vigorously debated. The quest is on for an adequate rationale for curricular d decisions in the social studies.[3]

At best, then, the social studies situation is unclear. The debates about what the revolution's goals should be and how they might best be accomplished have not been carried on over a sufficient period of time to permit complete answers to all the questions. (We must remember that a social revolution is a slow, tedious, and largely unpredictable thing.) No conclusive evidence exists that a revolution has taken place or that one is taking place in terms of classroom practice. The flux or the movement in the field to date focuses upon "meaning", and the current turmoil in the social studies can best be described in the terms of this conference, "The Search of Meaning." The basic questions under debate in the field are: What meaning do we wish to emphasize in the field of social studies? and How is that meaning acquired?

Understanding and being able to make sense of the debate is important for all those connected with teaching or administering a social studies program. It is a process requiring that at least some of the issues be examined, and the balance of this paper attempts to perform a portion of that task. At the risk of oversimplifying I shall describe the debate and the controversy by reference to two models of the social studies, one a traditional model and one an emerging or revolutionary model. Both models have characteristics, or working parts, which can be identified and analyzed. I should point out that the analysis will not be an objective one. My mind is made up, the evidence for me is in, the emerging model wins hands down. I should also mention that my description of the traditional model will be stereotypic, and the innovative model will be an ideal type. The result is of course that I speak as an advocate for a point of view, and my comments should be viewed as a set of claims to be tested and not necessarily as a description.

The Traditional Model. The social studies movement dates from about the turn of the century. At that time American education was in the midst of a progressive revolution, the nub of which was a reaction to pressing problems of the time--industrialism and its attendant problems, the Americanization of millions of immigrants and their children, and the generalized need for a better informed citizenry.

Educational leaders of the time constructed a bold new concept (call it Education For All American Youth), an integral part of which was "social" education.

The new concept should have spawned a radical, innovative model for social studies teaching. Perhaps the tolerance for innovation was too low, perhaps the number of children and adolescents too high. Whatever the reason, a quite different model developed during the first three or four decades of this century and has persisted to the present. It is a model possessing at least three identifiable characteristics.

1. A philosophy which emphasizes the transmission of a set of givens about social realities.

The social studies has never had an excess of sound philosophical statements, and no formalized philosophical rationales developed for the traditional social studies model. Rather, a number of assumptions about why the social studies existed became part of the conventional teaching wisdom. The social studies is an appropriate field to include in a general education pattern because the knowledge it contains results in better citizenship when learned by students. Also, knowledge in the field is assumed at times to be one of the hallmarks of an educated man. These assumptions also embody a view of content and the disciplines and of schools which are naive and yet powerful. Knowledge is an impersonal entity stored in books or in the minds of teachers and professors. The school is a place where the wonders of scholarship are revealed to the students so that they might achieve cognitive maturity. Their job is to master knowledge about social realities in a form that is largely abstract and symbolic.

2. An almost complete reliance upon history as the most appropriate curriculum vehicle for transmitting the givens. Granted, courses were and are drawn from other disciplines, but the core is and ought to be the study of man's progress from the beginning to the present. This progress report is viewed as important because it both illustrates how modern man got to be what he is and infuses those who study it with the grandeur of man's accomplishments. History has lessons which may be learned, and these lessons should be part of general education.

3. A methodology of teaching consistent with the philosophy of the givens. The basic methodology of the traditional model is derived from the view of education implicitly contained in the philosophy of the givens. Authority in the form of the teacher, texts, or other media, dominates. When a teacher wishes to teach better he finds a better text or a better film or a better transparency, the better to communicate the meaning of social realities to his students. While individual study projects may appear occasionally in the list of activities, the teacher remains the high priest in charge of the intellectual temple.

This model may be only a parody with no counterpart in the real world but I would argue that that is not the case, that the model squares fairly well with the way the social studies is perceived by the vast majority of its clients and practiced by a vast majority of teachers. Criticisms of this model are obvious but deserve detail. First and perhaps foremeost is the criticism that use of this model leads to intellectual sins of omission and commission. Specific illustrations of sins of both types are, unfortunately, numerous. Basically, the problem is that the core discipline of the social studies (history) has been seen as heritage rather than historical inquiry. American history courses have continued to perpetuate unsubstantiated myths about our past. The heritage to be inculcated is one involving heroes and events which are colored white; the heritage and the contributions of black, Mexican, and Indian Americans to the building of a pluralistic, problem-filled culture, are ignored. World history courses have settled upon Western civilization to the total exclusion of civilizations elsewhere. The words used to describe the huge epochs of history bespeak the point of view—the Tigris and Euphrates River Valley is the cradle of civilization (not a civilization, but Civilization); Greece, the cradle of democracy, where man (not some men or a particular culture) first learned to respect the rights of others; the Renaissance, when man (not Western Europeans) was born again. As one historian sums it up, "The function of history in American schools is to teach the children their heritage which is to serve as a basis for their patriotism and a rationale for our institutions . . . The big questions is: Can history be 'heritage' and still be accurate according to the canons of the historical profession?"[4]

Another major criticism involves the idea that information can be transmitted through an authoritative, teacher-dominated style. This ignores most if not all about how children acquire knowledge of social realities. The teaching strategy of the traditional model really has succeeded in emphasizing the lowest possible level of information from social sciences—the sets of so-called facts. It has been dominated by the "read-recite" syndrome and has been if anything dysfunctional, a hindrance to the understanding of the societies we live among.

The Emerging Model. The characteristics of the emerging model are quite obviously not unique to social studies nor are they particularly new. In fact, one could build a strong case for the argument for that "new" model is consistent with the thinking of educational reformers in every era. The current version of the model is far more sophisticated than ever before. Under the influence of rather substantial federally supported programs groups of scholars have been attempting to meld theory and practice by constructing materials for classroom use, which, it is claimed, are good illustrations of sound teaching practice.

In most respects, the emergent model stands at opposite ends of the spectrum from the traditional model. It, too, possesses three characteristics.

1. A philosophy emphasizing the discovery of the nature of social realities through the testing of hypotheses in the scientific manner. The underpinnings for this emerging philosophy is Dewey's How To Think. Recently theorists have applied Dewey's ideas to social studies and have provided a complementary set of statements which provide rather solid bases for a new social studies.

These social studies theorists advance claims to the effect that the social studies exist to provide students with skills of decision-making and the ability to analyze social phenomena. Like the assumptions underlying the traditional model, these claims embody a particular view of content and the social science disciplines. The disciplines are seen as dynamic; the products of social science research are seen as tentative explanations rather than absolutes or givens. The emphasis of these views drastically alters the role of social science in social studies. Some observers go so far as to suggest that social studies teachers should look elsewhere for content to illustrate their programs. More frequently, however, the new theorists argue that there is no set body of content which ought to be learned. They argue that products of social science are important, but they are essentially vehicles to the analysis of human behavior.[5]

2. A reliance upon a broad base of content drawn from ethics, philosophy, logic and law as well as history and the social sciences. If the basic reason for teaching social studies is social analysis, the resource base from which content is drawn must be the full range of man's social knowledge. Specifically, this means more attention to information from the newer, dynamic behavioral sciences and less attention to the traditional knowledge of the social studies. It also means more attention to questions of right and wrong in human affairs; to the question of how we know things are right and wrong, and to the problems of men who live in various types of social and economic systems. The function of these new types of knowledge is to provide an understanding of basic concepts and generalizations, not as a way "to master" the discipline, but as a way of understanding the problems, issues, and trends that dominate modern life.

3. A method of teaching consistent with a philosophy of inquiry. At least since the advent of modern psychology, it has been clear that pupils learn best when the content is presented in meaningful contexts, that learning is facilitated by the development of various types of thinking processes and when topics are taught in depth rather than breadth. All of these learning "principles" suggest that an open-ended teaching style emphasizing the analysis of data from the social sciences is most appropriate.[6]

The traditional and the emerging models stand at opposite ends of the educational spectrum. Each possesses a high degree of internal consistency, but each deals in opposing concepts or key words. The traditional model calls attention to what is known; the emerging model emphasizes problems, issues, and trends. The former views the student essentially as patient, someone to be treated with educational innoculations. The latter perceives the student as agent, an active mover and doer in his own education. One model tends to be static, the other dynamic. The old model views education as a read-recite enterprise. The new model sees education as a process of excite-discover.

Teaching Strategies and Materials to Implement the New Model

A discussion of the emerging social studies model is incomplete without some illustrations of the strategies and materials employed. The balance of this paper presents illustrations of some of the current thinking. Unfortunately, the number of possible illustrations is huge, and space is limited, What follows constitutes only a minute portion of a tremendous universe of possibilities.

Teaching Strategies. Inquiry teaching is a currently popular slogan for social studies but without specification and definition, the term quickly become ritualistic and unproductive. To illustrate a specific approach, I have chosen a description which could be called "concept development through inquiry techniques" drawn from one of the courses developed by Minnesota Project Social Studies Curriculum Development Center. The course, intended for seventh graders, has as its core the discipline of sociology.[7]

Two illustrations drawn from actual classroom experience will serve to illustrate the basic teaching technique used in the course. In one seventh-grade class, the teacher is introducing the concept socialization in the second unit of the course. Since this concept is highly abstract and difficult to present through a typical mode of defining and explaining, the teacher attempts to get her students to analyze social situations with which they are familiar. This is an edited version of a transcription of the classroom dialogue.

Teacher: Suppose we set up a situation and I ask you what will happen in this situation. Let's take two boys (call them Tom and John) at a school party which is chaperoned by Mr. Jones, the physical education teacher. Tom just happens to spill a bottle of Coke on John, and the two boys begin to argue and then fight. John gives Tom a left to the eye; Tom responds with a right to the jaw. Then Mr. Jones enters the room. Your problem is to tell me what Mr. Jones does.
Student: He stops the boys from fighting.
Teacher: Anything else?
Student: He gives them a lecture.
Student: Since their behavior is so bad he sends them to the principal . . . He may also notify their parents that they have been behaving badly at the school dance . . .
Teacher: So you think that Mr. Jones will tell them in one way or another that their behavior is not what it should be and they will be punished. Fine; I think that's what would happen, too.

Suppose we shift now to the morning following the fight. The boys are now in Physical Education class and Mr. Jones is their teacher. In the center of the gym is a boxing ring, and by luck of the draw, Tom and John are chosen to put on the gloves. We might think that this is just what the two boys wanted but for some reason (perhaps they are too tired) they don't do any more than move slowly around the ring. Not a blow is struck. Enter Mr. Jones again, now what does he do?

Student: He probably tells the boys to mix it up, to start to box.

Teacher: I agree, but the night before he told them not to do that. Why would he change his mind? Or did he change his mind? What do you think?

Student: It's not so strange; adults always act like that.

Student: The boys weren't doing what they were supposed to do in both cases. On the one hand, they were supposed to fight but at the dance they weren't.

The teacher goes on to present other situations where the social context determines how people should behave. (1. How do you dress to go to a dance? To a religious service? Why do you dress differently? 2. How do you address your best friend when you meet him at school? How do you greet a strange person you've never met before? Suppose you were to meet the President of the United States, how would you greet him? How do you know you should address these people in different ways? 3. Suppose you were going to spend a year in another country. Would you eat the same foods? Would your table manners be the same? Why?)

Slowly and without naming the process of socialization the class becomes aware of apparent inconsistencies in social behavior which indicate that people learn what are to them appropriate and inappropriate ways of behaving in certain social situations. The class then reads descriptions of lost or abandoned children (including a fascinating account of 'wolf children') and people who move from one culture to another, experiencing difficulty in many of the common everyday activities. The stage is set for a further discussion of how people acquire values and norms in a society and what importance this has for the individual.

The beginning understanding of the concept socialization acquired by the students through the analysis of social situations is used repeatedly later in the course. In the family unit, the students see the significant impact of this primary group on the socialization process. In their study of the school, the students note the continuing influences of social institutions on the behavior of people.

As the following illustration shows, the concept socialization appears in classroom discussion even when the teacher does not directly elicit it. This classroom episode, again an edited version of a transcript of classroom dialogue, took place in the unit on minority groups. The class is in the process of studying the life of American Negroes under slavery and has read excerpts from the contemporary commentary on this institution.

Teacher: We have now looked at some descriptions of what slavery was like. At least, what certain people thought it was like. We've read some comments by slaves, by slave-owners, and by foreign observers. Do you have any questions or comments about these readings?

Student: Well, I guess I'm a little confused. I always thought that all slaves hated it under slavery, but some of them said it was better than life after the war when they were free.

Student: Sure, they got food and clothes and everything when they were slaves. They just naturally like that better.

Student: You're just saying that the Negro is naturally more dependent than the whites were--and I think that's wrong. Because, I guess, that under slavery the slaves--some of them anyway--just learned to expect that they would get food and all. When they were free, they had to learn how to plan for a rainy day and to budget their money. It was bound to be a little confusing. Anyway, not all of the slaves liked it--Frederick Douglass didn't.

(Other students agree, the class concludes that most slaves probably did not really like life under slavery.)

Student: What I can't see is why more of them didn't rebel. Sure, some of them liked slavery, but most must have hated it. I guess I'd rather be dead than be a slave.

Student: They did revolt. I read a book that told about all the slave rebellions in the South. There must have been fifty revolts.

Student: But that means that only a few revolted, and I know a lot ran away. But most of them didn't. Why didn't more revolt?

Student: I keep telling you; they learned to act as slaves. As the one guy said, when the slave talked to a white man he hung his head and mumbled and shuffled away. He wasn't born that way--he learned it.

Teacher: When you say that he learned it, what really do you mean?

Student: I mean he was socialized in the same way we are. We learn to talk to our teachers in a certain way. Slaves learned a whole bunch of things in the same way. It's easy for us to say we'd rebel if we were slaves; but the reason slavery lasted so long was that the slaves were taught to be slaves and we weren't.

These illustrations deal with only one of the ten or so major concepts dealt with in the course. While variations appear in the method and techniques used by the cooperating teachers, most often each concept is approached by placing the students on the "horns of a dilemma" and getting them to see that their previous interpretations of social phenomena were inadequate to the task.

The attempt to deal comprehensively with the concept of socialization is somewhat typical of the strategies employed under the emerging model. A careful reading of the description and transcript reveals that the concept is not presented to a group of patients. Rather, by rather skillful discussion techniques, students analyze data and learn to identify and use the concept.

Materials and Learning Activities. In addition to a strategy of inquiry, the emergent model makes use of rather bold ideas about the kinds of materials and activities which promote learning. The rationale for these relatively untried ventures is that the most appropriate learning takes place when the student is active, involved, and participating in the education process.

Materials and activities which seek to make the students agents in their own learning can, of course, take many forms, and only a few illustrations are presented here.

Some of the most challenging ideas involve reading materials for social studies. The most typical materials in social studies are textbooks which describe and summarize a body of knowledge. The difficulty with texts as teaching tools for the new social studies is that they infrequently present data for analysis, but rather present an authority's conclusions for memorization.

Such teaching tools are inconsistent with objectives like critical thinking or reflective analysis, and innovators are seeking out a host of reading materials of a different sort. One unusual type of material for the development of social science concepts is the use of adolescent literature. For example, Light in the Forest by Conrad Richter is used in the seventh grade course referred to earlier to help introduce the concept of culture. Similarly the well-known Johnny Tremaine, by Esther Forbes is used elsewhere in the course to identify contrasts and similarities between family structures during colonial times and the present. Historical fiction has a long tradition in social studies teaching, and its use in social studies classes is by no means unique. But the typical use of historical fiction is to develop sensitivity to a historical period whereas in the emergent model it is used to help develop social studies concepts.

Another type of reading material is really a whole class of things usually labeled case studies. Such materials are really exercises designed to describe a situation or an event past or present and to allow students to read, discuss, and come to their own conclusions. The Harvard Curriculum Development Project, for instance, has constructed an intriguing set of case studies which involves students of junior high age in issues of value conflict.[8] The material at Minnesota includes case studies which teach the principles of historical method and political behavior to junior high students.[9] The focus of such materials is upon putting pupils in a position where they can discuss illustrations or situations intelligently, proceed to analyzing how the situation can be resolved and what their attitude is toward it.

Another genre of materials and activities includes attempts to have students experience social phenomena more closely. The best illustration is the set of activities falling under the label games and simulation. While controversy exists over the precise definition of games and their value as teaching devices, they seem to be exceptionally promising as teaching tools. The essence of their promise is that well-conceived games can enable all children to deal in one of the processes of society in a context that is safe and nonconsequential. For instance, students playing the game of "Dangerous Parallel"[10] play roles of significant political leaders in China, the United States, the U.S.S.R., India, and North and South Korea, just before the outbreak of war. They presumably can learn something of the nature of diplomatic relationships and the process and consequences of decision-making. Innovators are also planning activities that require the teacher to use data from the lives of pupils in a classroom. When studying variations in human behavior elementary school children can gather and analyze data about their own physical and social differences; Lippett and his associates at Michigan, for example, have structured a series of lessons in which pupils investigate social science topics organized around classroom interaction phenomena which students can easily identify.[11]

Finally, social studies innovators are exploring the possibilities for use of direct experience, action courses, and direct confrontations with the social phenomena being studied. While some similarity exists between the direct experience concept and the well-known field trip, the idea of direct experience is to provide a full or substantial learning experience rather than a brief introduction to the topic. To illustrate, one group from the Twin City area spent three days with their instructor living in a community of migrant workers. They came to the migrant community trying to get the feel of what it is like to follow crops and to understand the migrant way of life. As a special added feature they learned something of the reaction of a tight and reserved white community to two groups of aliens, themselves and the migrant workers.

Related "action experiences" in the field are cited by Newman in a recent article. He advocates that schools allow credit for such experience and arrange the time schedule to make it effective. His list of possibilities contains some truly exciting educational experiences.

> So as not to imply a conception of activism denoted exclusively by more spectacular, quasi-anarchic forms of group protest (draft resistance, student strikes, mass civil disobedience), this proposal recognizes significant educational value in the following types of "causes": efforts to redress grievances of individuals against bureaucracies (unreasonable treatment by registries of motor vehicles, draft boards, schools, employers, welfare departments); community improvement projects (recreation facilities, pollution control, inter-faith cooperation, housing rehabilitation, curriculum reform); and even the promotion of parochial "personal

> fulfillment" interests of individuals and associations (drama, music, and sportsmen clubs struggling for finances and facilities, organization of a neighborhood day care center, or entrepreneurs starting in business). Depending upon the constraints of the situation and the student's interest, his involvement could range from detached study and observation in the field to apprenticeship to leadership. It will be necessary to learn to use conventional lines of influence; election campaigning, behind-the-scenes lobbying, testifying, letter-writing, publicity campaigns, canvassing--as well as more subtle and dramatic techniques. Whatever the project, the purpose for including it in an educational program is to help the individual operate more effectively within the political system, not to provide charity or service to the community, though individuals should be free to choose that sort of project if they wish.[12]

To make these and other direct experiences educational demands that teachers and administrators realize that such activities are productive. School personnel must take seriously the psychologists' admonition that true learning is correlated with the experiences that students have.

Problems and Implications. This paper is only an introduction to the emerging model and can provide only a brief statement also regarding the problems engendered by the suggested changes. It has been my observation that advocates of the new social studies often present their ideas as panaceas, and this, I think, is a distinct mistake. So as to appear as something other than a "panacea presenter," I shall conclude the paper by listing several areas of problems.

The first problem is simply that the emergent model involves a substantial (and potentially total) change in the typical content and mode of teaching. In the past curriculum revision has been mere tinkering. Revisionists have argued questions such as whether American history should be taught in grade seven or grade eight. Such questions are no longer appropriate. Schools attempting to implement aspects of the new social studies model will learn something of the level of tolerance for change among teachers, administrators, and the community.

A second problem involves the inherent conflict between the emerging model and typical ways of organizing schools. If the new social studies is to be taken seriously the organization of schools must become far more flexible. Courses must become less time-bound, less restricted by restraints of the Carnegie unit, less dominated by a view that school keeps only within the walls of the school building. Anything less than a substantial change in the way in which teachers and students are organized for learning will probably be destructive of attempts to implement the new model.

Another problem area is the evaluation of learning activities carried on under the emerging model. Clearly, the older standardized or teacher-made exams no longer have the capability of assessing progress toward goals of the new social studies, nor are typical grading procedures adequate to the task.

These difficulties and problems should not cloud the basic issue. The issue is not whether the new social studies presents hard problems to school people. We know it does, but there is no reason to believe that the life of teachers and administrators should be problem-free. The basic issue is really whether the transition from traditional to emerging is worth the trouble, whether social studies people are willing to engage themselves in a search for meaning in social studies. Perhaps the best way to test this thesis over the next five years is to determine whether school people are mobilized by the challenge or immobilized by the problems.

Footnotes

1. For a brief overview of the new social studies, see Edwin Fenton, *The New Social Studies*. (New York: Holt, Rinehart, and Winston, 1967)

2. John Dewey, *How We Think*. (New York: D.C. Heath, 1933.)

3. The Krey Commission Report was published in sixteen volumes by Charles Scribners Sons between 1932 and 1937.

3. William Van Til, "Forward", in James P. Shaver and Harold Berlak, *Democracy, Pluralism, and the Social Studies*. (Boston: Houghton Miflin, 1968),p.2.

4. Robert F. Berkhofer, Jr., "The Many Meanings of History", Discipline Paper #4, of the Minnesota Project Social Studies Curriculum Development Center, Mimeographed, p. 14.

5. Edith West, "Concepts, Generalizations, and Theories," and "The Social Science Disciplines, "Position Papers #3 and #5 of the Minnesota Project Social Studies Curriculum Development Center. Mimeographed; Maurice P. Hunt and Lawrence E. Metcalf,,*Teaching High School Social Studies* (New York: Harper, 1955); Donald W. Oliver and James P. Shaver, *Teaching Public Issues in the High School* (Boston: Houghton Mifflin, 1966).

6. William E. Gardner and Vincent R. Rogers, "Learning Principles and Social Studies Curriculum," Postion Paper # 4 of the Minnesota Project Social Studies Curriculum Development Center. Mimeographed.

7. These illustrations were taken substantially from a chapter by the authors in Robert Irvine Smith (ed.) *Men and Societies* (London: Heinemann, 1968), p. 38-45.

8. See Oliver and Shaver, *op. cit.*

9. See William E. Gardner, Robert W. Beery, and James R. Olson, *Case Studies in American History*, Vol. I (Boston: Allyn and Bacon, 1968); and Edith West, "The Curriculum Design,"Position Paper #6 of the Minnesota Project Social Studies Curriculum Development Center.

10. "Dangerous Parallel" was created by the Foreign Policy Association, 345 East 46 Street, New York City.

11. Ronald Lippett, Program Director, the Center for Research on the Utilization of Scientific Knowledge, University of Michigan, Ann Arbor.

12. Fred M. Newmann, "Political Socialization in the Schools," Harvard Educational Review, 38:3, Summer, 1968, p. 541.